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The Magazine of TOTAL TELEVISION

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NOVEMBER  
1986

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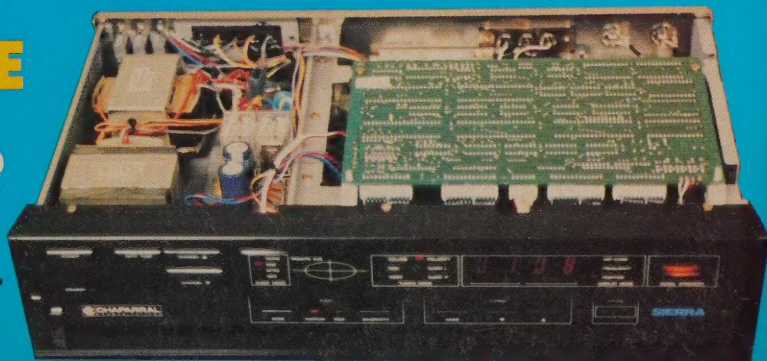
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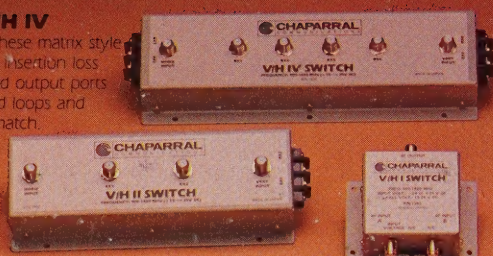


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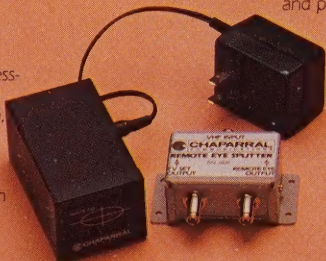
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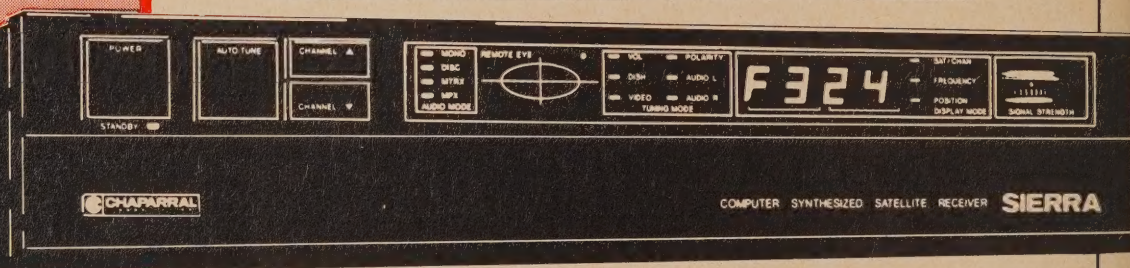


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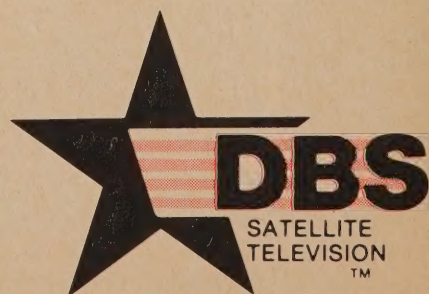
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# Home Satellite TV

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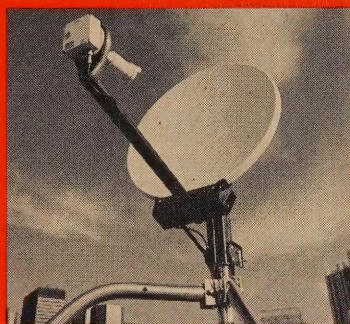
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**COVER** Cartoonist Dennis Ellefson captures today's dish buyers. Chaparral Sierra was used in our Ku upgrade, page 34.



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## CHEAPER DESCRAMBLERS ARE COMING!

When M/A-COM introduced the VideoCipher descrambler late last year, it was greeted with astonishment over its technological wizardry. Those who believed that whatever man scrambled, a hacker could unscramble, were taken aback. Yes, the video could and was quickly broken. But the audio? Some claimed it never could be unraveled.

But, apparently it has been...or soon will be. Here at the magazine we've repeatedly had reports of hackers claiming to have broken the scrambled audio code. Until recently, all proved false.

But now, we've had reports that not one, but *two* companies—one in the U.S. and the other in Canada—are hard at work determining the legalities of introducing a descrambler at a far cheaper price to compete with the M/A-COM unit. Would they be doing this if they had not already broken the audio code?

In addition, one of our Contributing Editors reports that he has personally seen a "chip," that when introduced to the Oak/Orion descrambler, permanently locks it open. And he says he expects a similar chip to be soon introduced (probably by the time you read this) for the M/A-COM box!

Will it be legal to sell competitive descramblers in the U.S.? Is it legal for a private individual to buy a chip to permanently lock open a descrambler unit? Does anyone know?

Stay tuned as we bring you informed commentary on the latest developments in the scrambling wars.

*Bob Wolenik*  
Editor

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# Black Boxes

## *A Legal Alternative Or Future Competitor?*

In Chicago in 1979 a company named ON-TV began selling a commercial-free subscription movie service in the Chicago area, broadcasting an easily decoded signal from a tower on Chicago's Lakefront to subscribers in the city and suburbs who rented decoder boxes. Immediately a black market in black boxes arose and ON-TV's attorneys were kept very busy pursuing and punishing the makers and sellers of unauthorized decoder boxes. Consider the Case of On-TV versus Pirate Antenna of Illinois, Inc. No kidding, that was the real name of the company. ON-TV sued for a permanent injunction against Pirate, because Pirate was building black boxes which were beige in color. It happened that some of the owners of each company lived in my neighborhood and I became involved in the negotiations. The settlement was amicable in this case, but ON-TV was necessarily aggressive in taking action against all black boxes. Cable was coming to the suburbs and the company had a very

narrow window of time in which to recoup its investment and to make a profit before cable took the business away. Any household with a black box constituted a direct reduction of the company's profit potential.

Now the situation has returned on a national and even international scale involving the U.S., Canada, Mexico and various islands and countries south of the border. M/A-Com has stated that its VideoCipher has been put to use in Canada by persons using U.S. billing addresses to foil the addressable safeguards. But the big news is that it appears that boxes may have been developed which can decode the VideoCipher's signal, both visual and audio, just like VideoCipher II. Also, technological improvements may make it possible to actually improve the quality of reception by using black boxes.

And now I suppose you want to know where to get one, how to use it and if it is legal. In answer to the first question, availability may well depend

upon legality. If it can't be sold legitimately, you will be buying on the black market or gray market, and you will be taking your chances of being cheated or of getting caught and fined. If it can be sold legitimately it will be marketed and advertised the same way any other piece of electronics equipment is sold. In the old ON-TV market it didn't make sense for larger manufacturers to get involved or to compete in the sale of the boxes or to be licensed to sell them, except in relation to a competing subscription service.

But the technological advances of satellite TV have increased the potential market to a size that will justify more than one player on the field. There is now room for alternative systems and there is room for compromise, licensing and revenue sharing which would substantially broaden the market for all competitors. For this to come about, some competition must come on the scene and some compromises must be made.

But the legality of black boxes is a very complex question. There are many laws concerning the manufacture, sale, and use of communications equipment and many ways of controlling the activities of manufacturers and sellers and even the users of such systems by both civil and criminal sanctions. The problems lie in the various areas of hardware patent, software copyright, program copyright, license and contract rights and just plain "what is fair" rights, also known as "equities". These issues are all interrelated in such a way that it is difficult to separate their action and effect in the marketplace. We will try to separate them out here so their interaction is more easily seen. There are many ways for the use of a unit to be "illegal". You may use the box to intercept unauthorized signals and be in violation of the 1984 Cable TV Act, which provides sanctions for the unauthorized reception of encrypted signals. The signals may be copyrighted material for which you have not compensated the authors and producers. The equipment you are using may infringe upon a patent granted by the U.S. patent office. The hardware itself is subject to protection by the U.S.

---

***"The big news is that it appears that boxes may have been developed which can decode the VideoCipher's signal, both visual and audio. Also, technological improvements may make it possible to actually improve the quality of reception by using black boxes. And now I suppose you want to know where to get one, how to use it and if it is legal."***



Patent office which can protect the original inventor's right to an exclusive market for 17 years. Similar types of protection are granted to the software that makes the hardware do its job and to the programming which is transmitted and received by the hardware. In addition to those rights are the rights of the authors and producers of the copyrighted material which is transmitted. Also there are criminal sanctions for the unauthorized reception of a copyrighted signal if it is encoded.

M/A-Com has applied for patent protection which could give it control over the VideoCipher system and certain components for a period of 17 years. Others have applied for similar protection of their systems and components. Our resident Patent Attorney tells me, for instance, that a system patent does not protect components of a system and that a component patent will not protect a system. As a result, numerous patent applications have been filed. Oak Industries, Inc. has claimed that the VideoCipher infringes on patents applied for by Oak for its Orion signal scrambling and decoding equipment. Oak has also sued Zenith Electronics Corporation, Regency Electronics, Inc. and Tocom, Inc., a subsidiary of General Instruments Corporation which is, in its turn, buying the VideoCipher businesses from M/A-Com, Inc., the developer of the VideoCipher System.

This litigation and negotiation may allow an opening for other companies to apply for licenses under existing and pending patents. The VideoCipher is the industry standard at present and the one that the signal suppliers are most likely to use. But there are other possible systems and designs which may contain marked improvements over the VideoCipher because technological development was not frozen with the development of the VideoCipher technology. Perhaps encoding systems can be arranged to work together so that one box could decode all systems and the manufacturers of the systems could share revenues with signal suppliers and with one another. Competing systems and components could coexist and this

*Continued on page 75*

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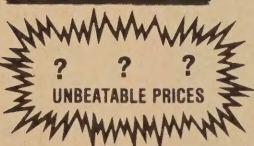


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# How **SMALL** It Is

## *The Satellite Revolution Is Spreading To The Pacific*



**New Zealand Dish** - NOT the U.S., 7 and 8 meter dishes serve motels and hotels on the island.

**M**y wife Pat and I recently spent 40 days and nights traveling outside of the USA, starting in Hong Kong and then jetting our way through southern China, Singapore, Australia, New Zealand and Tahiti. This was one of those trips of a lifetime and it gave me the rare opportunity to talk and meet people who are involved in the satellite revolution in the Pacific. The importance of what began here in North America in the mid-70s (when the first experimental home dish terminals were installed) should not be underestimated by those who are trying to reshape the American dish industry during this period of product uncertainty.

Our present concern in North America is that we may be losing, to scrambling, a numerically insignificant number of channels. The uncertainty of all of this is blamed for a dramatic slowdown in marketplace activities. Pat and I found that there are similar events occurring in the Pacific as well.

There has been a mini-TVRO industry in Australia for perhaps five years. The first Australian TVRO pioneers attended the February 1980 US industry trade show (the second such trade show held) and returned to Australia with the promise that their citizens would one day soon have access to television. There are an estimated 300,000 dwelling units in Australia which have inadequate or no television service. Most of these homes or ranches are located in extremely rural areas where distances between homes are measured in the hundreds of kilometers. These homes tend to be centers for farming, or mining or they may be way stations on some of Australia's outback railroads and highways. The important thing is that people do live there and these people have been outside of the mainstream Australian lifestyle because they have been denied access to Australian broadcasting services. The Australian TVRO industry has been well known and quite visible for most of those five years. It infected some other nearby countries as well; Papua New Guinea for example. In PNG an estimated 900 to 1100 home systems were sold between 1981 and the present time. Australia, far larger in size and population, perhaps had

3,500 of 'our' systems installed. For those few people involved in the selling of home systems there, business was brisk if not outstanding and several people became very well off with the coming of TVRO.

1200 miles east of Australia, in New Zealand, there was no known home dish industry. Pat and I went anyhow since we wanted to visit the 'Switzerland of the Pacific.' It was therefore something of a shock when we rounded a corner in our rented car and there, dead-ahead, was a large seven meter (22 foot) satellite dish looming above a motel. We made an immediate stop and with considerable excitement burst into the tiny office to ask about the dish. "We watch American television with the dish" was the off-handed response. "We were one of the first to have one...let's see, it was two and a half years ago." We would also learn of a small, pioneering company building 7 and 8 meter dishes (remember, those are meters, not feet!) with (they admitted) 'about 50 motel and hotel installations in place.' We talked with perhaps a dozen of the motels with dishes in place in New Zealand and heard the same emotions from each. I summarize:

- 1) The dishes provide a single channel of reception from American Forces Radio and Television Service (AFRTS) which the US military operates worldwide to provide live, American television to far-flung US military installations.
- 2) Until this past January, the same dish also provided a channel or two of reception from Australia. The Australian's first satellite system had been using the same international (Intelsat) satellite as the AFRTS; since January the Australians have been using their own, domestic, Ku band satellite.
- 3) In a very competitive motel industry in New Zealand, having American television in the rooms has been almost as important as having a swimming pool. Holiday travelers book weeks and months ahead to be assured of a room at those motels that feature US television; when major sporting events (such as World Series) are underway, the rooms are booked years in advance!

The same AFRTS service that is so important to the New Zealand motel and hotel industry also figured prominently in the initial sale of dishes in Australia and PNG. For the past several years, an entire segment of Pacific island residents have become accustomed to and very dependent upon the American AFRTS service. In Australia and PNG, a measureable number of these people are in fact Americans, retired to the south Pacific or there on a long work assignment.

Australia and New Zealand during this period of years had their own national television services. In Australia, most of the dish buyers live where normal TV reception is not possible. In New Zealand, because of careful and painstaking engineering, virtually no home does without television reception. In PNG, local television is still not operating. What these three countries, and others of less reknown in the same area share in common is a vital link to the United States through the AFRTS.

Alas, into this state of south Pacific bliss, a spoil sport is loose. AFRTS is to begin scrambling soon. Lt. Colonel Larry Pollack is

*Continued on page 80*



# Portable Dishes

## *TVRO For Apartment Dwellers And Travelers*

BY PHILLIP PATTERSON

**F**or more than five years now, home satellite television has been available to U.S. consumers. In that amount of time, roughly two million households have opted for the convenience and versatility of satellite television viewing, first in the rural areas, and more recently in the suburbs. While the growth is remarkable, what these numbers also say is that only a small fraction of the nation's 85 million households (according to census figures) have joined the ranks of television receive-only (TVRO) owners.

While there is no doubt the uncertainty of available and unscrambled programming have blunted sales, that alone does not explain the failure of the TVRO industry to claim a more significant market share in its first half-decade.

Several other reasons have emerged that account for much of the tardiness of the public to accept satellite television. First is the cost of the typical system, usually between \$1,500 and \$3,000. Second is the fear of TVRO technology by consumers who are afraid they won't be able to install it or work it once it is installed. Third is the simple fact that many Americans rent their homes, apartments or condominiums and they are hesitant to spend hundreds of dollars on a luxury that remains behind when they leave. Finally, many would-be owners simply didn't have the space for a system, living, for instance on an upper-floor apartment with only a balcony for outdoor space.

In the past, these life situations—lack of space, modest income, failure to own a home—"disqualified" millions of consumers from becoming a potential customer of TVRO equipment. However, several new "patio mount" dishes from a number of man-

ufacturers have changed that scenario, and in the process, made virtually every household in the nation a potential home satellite receiver site.

Several of these patio mount dishes have emerged at TVRO equipment shows in Las Vegas and Dallas this year, with manufacturers reporting brisk consumer interest among people who, in the past, would not consider home satellite television for one of the reasons already given.

Just what are these new patio mount dishes and why are they so attractive to the first-time buyer? The answer is found in what they do that other satellite equipment has so far failed to do: portability, storability, easy set-up in a limited space. Before we examine each of these qualities, let's review what a satellite antenna, or dish as it is popularly called, does and how this system works.

Though it is the most visible, and most expensive part of the satellite television system, the antenna is actually the easiest part of the system to explain. It is simply the part of the system that "catches" and reflects the signal that you ultimately view on your screen. Its size can be explained by the extremely weak signal that it is gathering; the more signal gathered, the stronger the picture. Its shape, known as a parabolic curve can be explained by the fact that the signal must all arrive at the system's electronic feedhorn at the same time, hence every part of the dish must be an equal distance from the feedhorn which projects from the middle of the dish.

Dishes are of several compositions, several sizes and are manufactured either in single pieces or as a single unit, none of which is as important as the ability of the dish to maintain a curve over a prolonged period of time.

Now that some of the "mystique" is

gone from the dish, we will address how the current patio mounts have created a whole new generation of satellite television consumers.

In the early days of TVRO equipment—and remember that the early days were only the early 1980's in this industry—the electronic components used in the industry were crude. Low noise amplifiers, for instance, which were designed to amplify the weak signal received off the dish added much "noise" to the picture in the process. This, in turn, meant that more signal had to be gathered, meaning that dishes had to be larger. In those days, the only home dishes one saw were in the 10 foot or larger region and mostly in rural areas where their size (and unsightliness) were of no consequence.

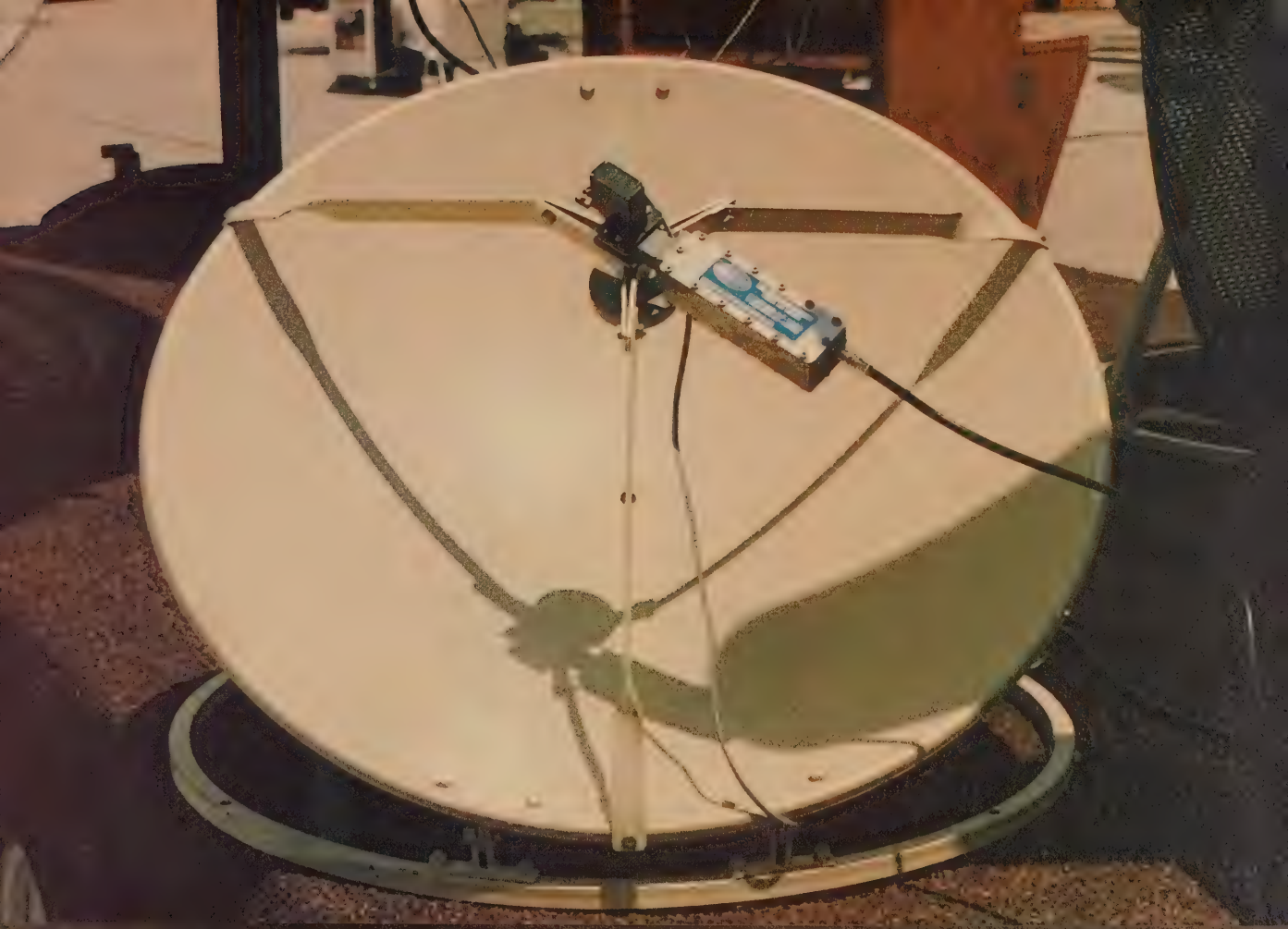
As the state of the industry's electronics improved, the size of dishes has shrunk with no major loss in picture quality. This fact brought dishes to the suburbs, where size and appearance was a major consideration in any system purchase. But even these early small dishes were based on a couple of assumptions that were not true for

*Continued on page 14*

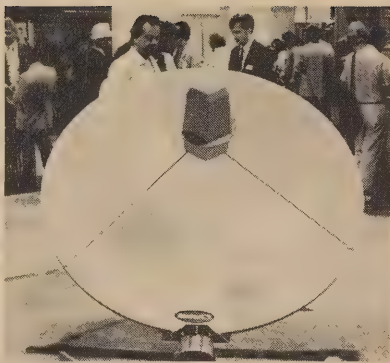
### **Easy To Carry/Easy To Set Up -**

*Portables can deliver good picture whether solid or mesh. Increasingly used by those with limited space or by vacationers, dozens of channels are available depending on dish location and satellite strength.*

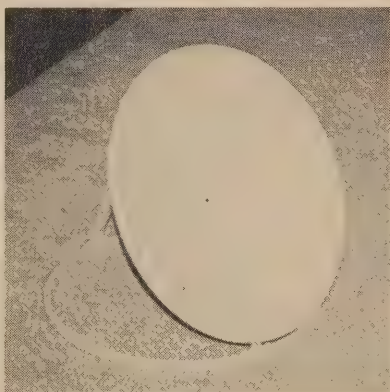








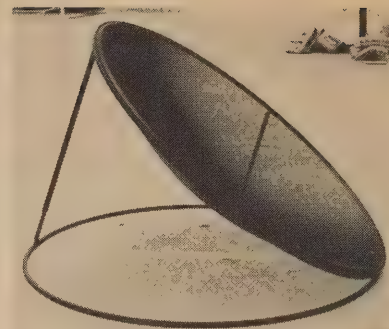
**Easily moved** - This Echo Star is portable sized.



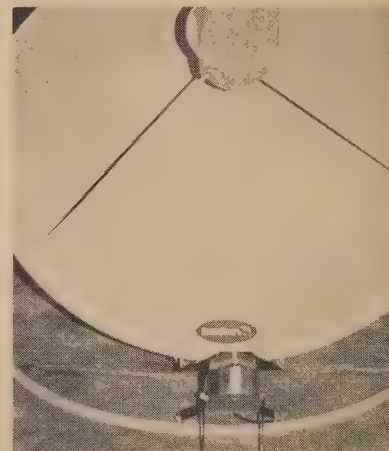
**Small and powerful** - It picks up good Ku pictures.



**Easy To Set** - The "Little Wil" features a scale on the back brace. Once calibrated for your latitude, it never has to be recalculated, even if the dish is folded up for storage!



**Mesh Dish** - Often lighter weight than solid portables.



**Take It With You** - Great for vacations.

## Portable Dishes

some consumers—that the purchaser had plenty of room and that the purchaser was in a home that they considered a permanent residence. Just as the industry could not thrive serving only the rural farmer with boundless room for the system, the industry quickly discovered that it could not continue to thrive serving only those suburbanites with spacious lawns and no intention of moving after having invested in a TVRO system.

The patio mount satellite antenna is the industry's answer to the consumer requirements of affordability, portability, storeability and simplicity. Most are no more than four feet in height (the five or six foot dishes are tilted about 50 degrees depending on your geographic location) and they all store flat. None require, or even need, professional installation. All of the models we saw were under \$700 retail and some began at \$450.

To imagine what a patio mount dish looks like, imagine a piece of fine china or a souvenir plate that one might have displayed on a stand. A patio mount antenna looks like that displayed plate

on a larger scale. The typically 5- to 6-foot dish (though one manufacturer features a 7-footer) is held at an angle by a tubular mount which is usually a circle or a triangle at the bottom. Only one model we have seen, the Echo Star had an actuator option (a motorized positioner). In most cases, the satellite antenna is literally aimed at the satellite by hand.

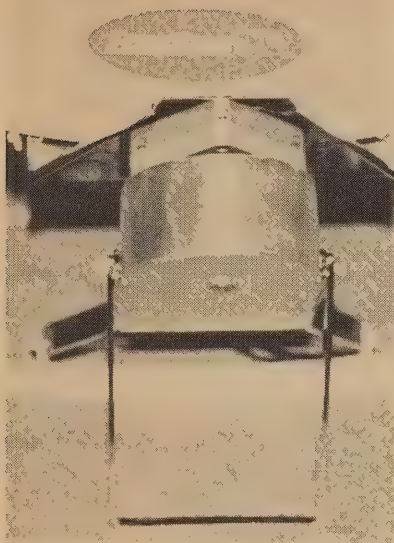
Most of the models feature an offset feed attached to the bottom of the dish which folds up into the dish for storage. Others feature a feed that can be easily screwed out for storage. This is an important feature of these dishes since many of the potential buyers plan to store the dishes when they are not in use. Though the models come virtually assembled, the real challenge of these systems is getting them aimed properly for viewing, something that larger dishes with actuators do automatically. Manufacturers of the patio mount dishes offer several tips in the process.

The first setting, the angle of the dish, need only be made one time. All of the models have a telescoping pole

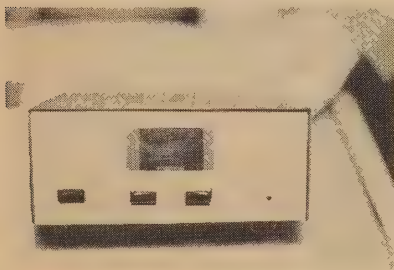
in the back that allows the dish to be set at an angle that corresponds to your latitude or distance from the equator. One of the models, the Little Wil even came equipped with a scale on the back. Once the consumer (or the dealer if "installation" is included) gets the angle set it will never change, no matter what satellite is tuned in as long as the dish is used in the same latitude. If the dish is ever stored, the angle can be marked with a simple pencil line on the pole for future reference.

The second setting—locating the individual satellites—can be a little trickier, and many users of these dishes buy them with a limited number of satellites in mind for their viewing. Again, there are tricks that will help with the process, and like before, they involve marking a successful effort for future reference. The first step in finding the satellites is to put the television beside the dish if possible so that the one doing the positioning can see the effects. The second step is to get a manual of satellite locations, by degrees, and a compass so that you have a rough idea of where the available satellites are.





**Adjustable** - Device allows for accurate elevation setting.



**Portable Electronics** - Just as important as a good dish.



**Outdoor TV** - Can be used to get a TV picture in your yard, from DH.

The best method is then one of trial and error until the desired picture is clear on the adjacent television screen. When it is clear, place a mark on the patio that shows the position of the dish when the bird was found. If the base is triangular, drawing a line along one edge will do. If the base is round, you might want to put electrical tape on two places on the tube across from each other and draw a line along this makeshift diameter. You can then label these marks so that you know what satellite they correspond with. (See diagram below.)

Once you locate a satellite with the antenna, the picture you receive should be good, according to the models we have seen in use at recent trade shows. One of the traffic-stoppers at a show in Dallas was a 32 inch model by DH Satellite pulling in a beautiful picture off of Ku-band satellites. The C-band dishes, 5 and 6 foot in diameter were of equal quality as well. It is essential to remember, however, that a dish of this size needs an LNA of 85 degrees or better to pull in a really good picture. Remember also that better LNA's are

the ones with the lower temperature ratings. An upgrade of about 10 degrees in an LNA will cost about \$10 to \$20 and is well worth the investment. A better LNA is not a substitute for a larger dish as some would have you believe, but it is a good investment to make a small dish better.

The patio mount dishes are filling a niche in the home satellite television market that has up to now been ignored. Purchasers of the systems like the storability of the systems, whether for security or aesthetics. Some of the purchasers of the systems are putting them in second homes, such as cabins, where they are stored much of the year. Other purchasers want to use them for an occasional ballgame but don't want to see one in their yard year-round. Other purchasers like the small amount of space the system requires. Some purchasers have even been apartment dwellers who place the system on their balconies.

Other purchasers of the system see the patio mount antennas as a low-risk way to try home satellite television. The low purchase price is not inflated

by a high installation cost or expensive accessories. Therefore, for many, the system costs less than one year's subscription to cable while getting many more viewing choices and owning the system. Dealers report that many buyers who begin with the patio mount system soon upgrade to larger and more permanent systems. A good dealer will probably even have a trade-up system in place at his business, something you might check on before making a purchase. While we are on the subject of dealers, many are taking advantage of the portability of the systems to let customers try it before they buy by leasing it over the weekend to potential buyers. You might also explore this option with your own dealer.

What the attractions seem to have in common is that with the patio mounts, nothing is permanent. No holes are dug; even cable is usually not buried. No long-term debt is acquired and the back yard does not get a permanent, non-removeable fixture. But in most cases, the attraction to satellite television is both permanent and rewarding. ✎







# Great Deals In Dishes

## *Why Now Is The Time To Buy That Complete System*

BY BOB WOLENIK

**T**he word is getting out. The price of home satellite systems is dropping.

It's the same sort of thing that happened in the computer field. Competition between manufacturers, discontinued models as technology races forward, sluggishness as the field slowed down due to uninformed publicity over scrambling have all contributed to making this a paradise for the price conscious buyer.

Consider these facts. In 1976, a home satellite system would have cost in the \$20,000 range. By 1980, it was down to about \$8-\$10,000. By 1984, a top of the line system could be purchased for under \$5,000. Today, a top system can be purchased for \$2-\$3,000, installed. If you're willing to do the work yourself, an adequate system can be purchased for well under \$1,000!

If price was ever a consideration, it would seem that now is the time to act. As Mike Termondt from DBS in Ventura, California points out, "Good systems are available today for very low prices. Lots of equipment has been discontinued because of technology breakthroughs. For example, if you're willing to settle for an LNA (single TV set performance) instead of an LNB (multiple set performance), you can get one for only a few bucks. If you're willing to settle for a receiver that only gets C-band (the current standard) instead of Ku band (the possible future standard), you can find an excellent buy. The key is to determine what equipment you want and then seek out a reputable dealer."

Bob Champi of New Wave Satellite Communications on Staten Island in New York echoes the sentiment. "Prices have come down at least 10 to 15 percent during the past year. And being New York, we're in a very high-priced market."

Bruce Danielson of the Satellite-Video Store in Bend, Oregon adds that, "Today, most receivers are good quality. The poor quality ones have all weeded themselves out of

the market. As long as you're careful about compatibility, you can put together a high quality, low cost system.

Given the fact that bargains are now available out there, we at *Home Satellite TV* magazine decided to see just what really was available. In an informal survey we called dealers from various locations around the country to find out what kind of systems they were selling. We were interested in the price and what that price bought. (Note: Prices quoted may have changed since the survey was taken.)

The results were surprising. A lot seems to depend on what area of the country you are in. Higher priced metropolitan areas tend to have higher cost systems. Rural areas tend to have lower cost systems.

In addition, there is the vital matter of service and installation. Most people simply aren't willing to "do-it-yourself" with something as high-tech as a home satellite system. Thus, a substantial portion of the cost is the installation and the dealer's warranty. Here's what we found:

### THE SATELLITE-VIDEO STORE

63102 N. Highway 97, Bend, Oregon

Bruce Danielson noted that business had been strong during the spring and early summer, though it dropped in mid-summer. This was a comment frequently reiterated by most dealers. Apparently people just don't watch as much TV during the warm summer months preferring, instead, to be outside. With fall, however, business and perhaps prices could be expected to inch up.

Bruce was offering three separate systems. All included full installation including wiring and parts.

### For \$995 INCLUDING INSTALLATION

1. 9-foot Goldstar dish with a 10 year warranty
2. Uniden 2000 Receiver
3. Manual positioner

*Continued on page 18*



# Great Deals

It should be noted that the above system, though complete, does not allow the user to turn the dish from satellite to satellite remotely from inside the house. Instead, you have to go outside and manually crank it around.

## For \$1,495 INCLUDING INSTALLATION

1. 9-foot Goldstar dish with a 10 year warranty
2. M/A-COM H-1 receiver
3. Automatic actuator/positioner  
(includes remote with stereo)

On this and the following system, there was remote control of the dish from within the house. Just push a button and the dish would automatically be moved by motor from satellite to satellite.

## For \$1,895 INSTALLED add to the above package:

4. M/A-COM Video-Cipher descrambler
5. 6 months free subscription to Showtime
6. 1 year free subscription to CNN and CNN2

Bruce noted that throwing in the descrambler and a subscription to several of the premium channels had eased customer concern about the scrambling issue and had improved business considerably.

## For \$1,995 INCLUDING INSTALLATION

1. 10 foot Goldstar
2. Chaparral Sierra (automatic positioner, stereo, Ku band) receiver
3. Motor drive for dish.  
options include adding:
4. M/A-COM Video-cipher - \$395
5. Ku band installed - \$450

## NEW WAVE SATELLITE COMMUNICATIONS

2300 Hylan Blvd., Staten Island, New York

Bob Champi prefaced his description of systems by noting that his store was in one of the highest priced areas of the country. Consequently, we could expect slightly more costly systems.

He also pointed out that he always suggests to people who buy systems, that they take great pains to get a good installer. He noted that there had been all sorts of problems with roof mount installations put up by inexperienced installers "on a Saturday afternoon."

"I always tell people that a couple of hundred dollars more on a system when you're already paying this magnitude of money isn't worth fooling around with."

## For \$2,800 INCLUDING INSTALLATION

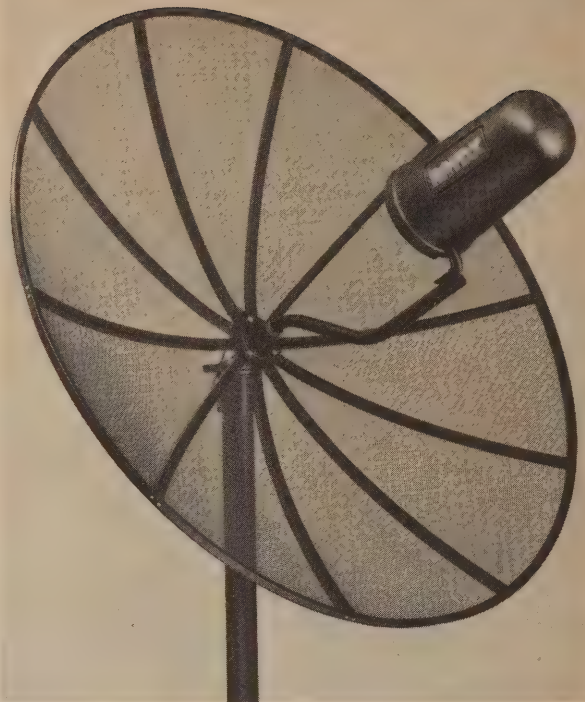
1. Uniden 5000 receiver
2. Uniden 730 programmable positioner
3. 10 foot Orbitron dish

## For \$3,895 INCLUDING INSTALLATION

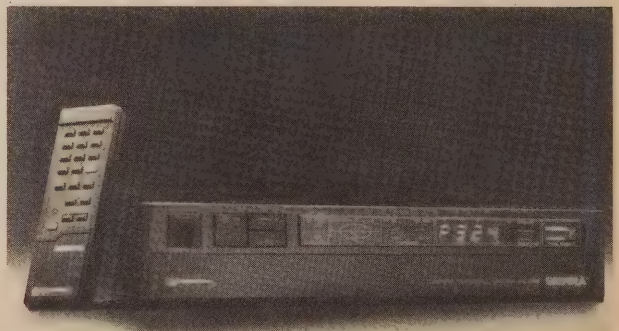
1. 10 foot Winegard perforated antenna
2. Kenwood KSR 1000 receiver
3. Kenwood KST 1000 positioner
4. M/A-COM descrambler

Both installations include a 1 year unconditional service contract.

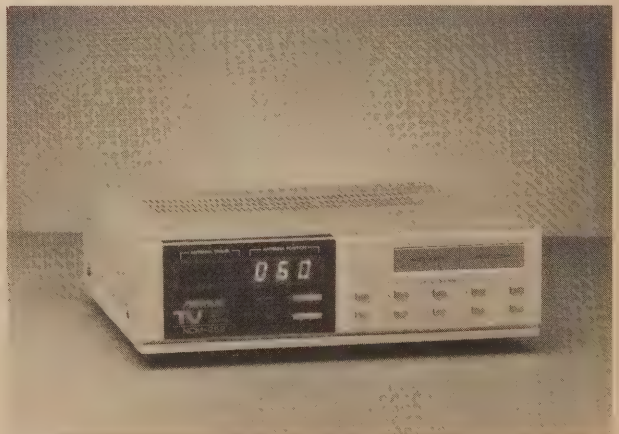
Bob notes that during the summer months he was throw-



**Popular Dish** - By Raydx offered in bargain systems.

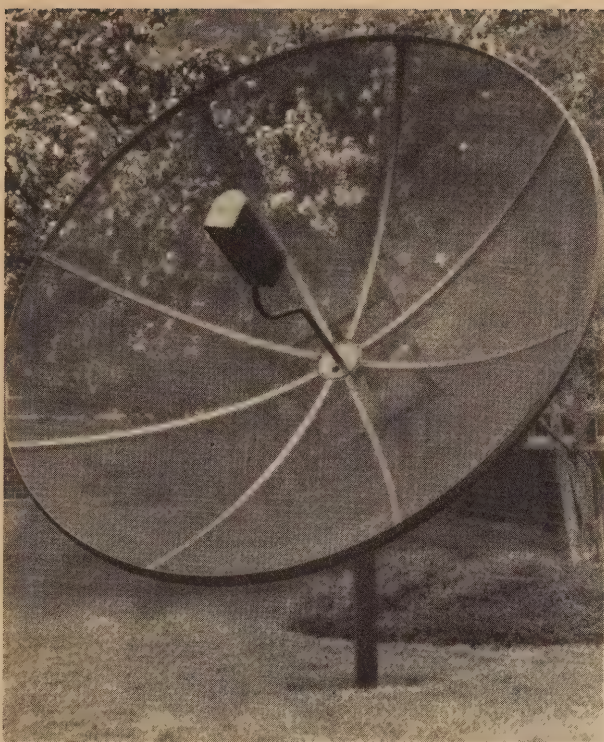


**High End Performer** - Chaparral Sierra featured by some dealers.



**Featured** - In under \$2,000 system is this Norsat receiver.

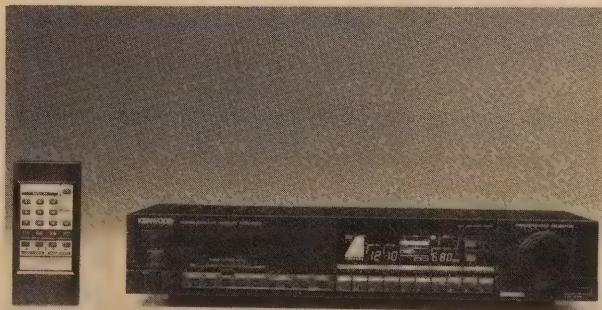




**Dealer's Choice** - Winegard featured in high-end system.



**Often mentioned** - Drake receivers popular in bargain systems.



**Make A Deal** - Kenwood receiver offered by dealers.

ing in a second Uniden 5000 receiver as a bonus. Also, he calculated the value of the installation in his area with a one year warranty to be around \$800 to \$900.

#### **MILE HI SATELLITE SYSTEMS**

1623 Blake St., Suite 420, Denver, Colorado

Alan Levy noted that his business was founded on the belief that the home satellite field was definitely the industry of the future. He noted that what he and other dealers as well as manufacturers needed to do was to intelligently inform the consumers as to the reality of programming. He offered the following two systems.

#### **For \$2,800 INCLUDING INSTALLATION**

1. 10 foot Orbitron or Radyx or Beta 9 (perforated dish)
2. M/A-COM or DX800 or Drake 824I receiver/actuator
3. 85 degree LNB
4. 150 feet of cable
5. 1 year parts and labor/5 year dish/90 day installation warranty

#### **For \$2,450 INCLUDING INSTALLATION**

1. 10 foot Orbitron on Beta 9 dish
2. Houston Tracker 5 receiver/actuator system
3. 85 degree LNB
- 4 and 5 same as above.

Alan indicated that he also sold M/A-COM descramblers, but that they were strictly an aftermarket item for him. "Few buy the descrambler at the same time they purchase the system. They see all the programming that's available and they're thrilled by it."

#### **HOME ELECTRONICS**

220 E. Main St., Belmond, Iowa

Larry Turner notes that, "A lot of the people we sell to are on a rural route. The only broadcasting they can see comes from the satellite programming. If it wasn't for us, they wouldn't have any TV at all.

"We finance most of our systems on a three to five year plan. If we get the charges down to the \$30 to \$40 range, people see it's comparable to cable and they go for it.

"I'm bullish on the industry. I don't think we can expect help from Washington. I think the technology is going to win out."

#### **For \$995 NOT INCLUDING INSTALLATION OR DELIVERY**

1. 8 foot Laser fiberglass dish
2. Bandall receiver
3. LNA

#### **For \$2,000 INCLUDING INSTALLATION**

1. 8 foot M/A-COM fiberglass dish
2. M/A-COM T-1 receiver with remote
3. 85 degree LNB
4. T125 M/A-COM actuator
5. Installed up to 100 feet from house.

#### **For \$1895 INCLUDING INSTALLATION**

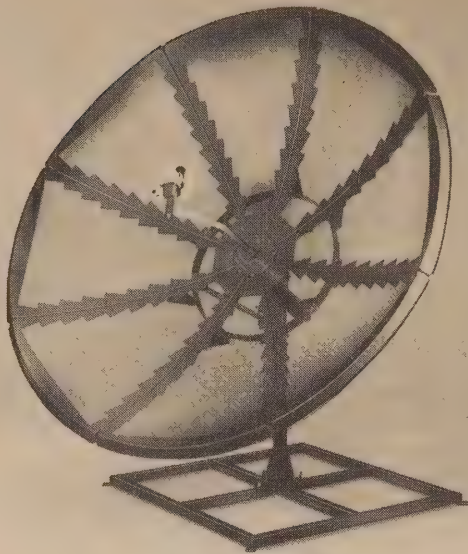
1. 10 foot Odem dish
2. JR 200 Norstad receiver
3. 85 degree LNB
- 4 and 5 - same as above

#### **DBS SATELLITE TELEVISION**

2316 Channel Dr., Ventura, California

Mike Termondt provides sales from DBS but does not

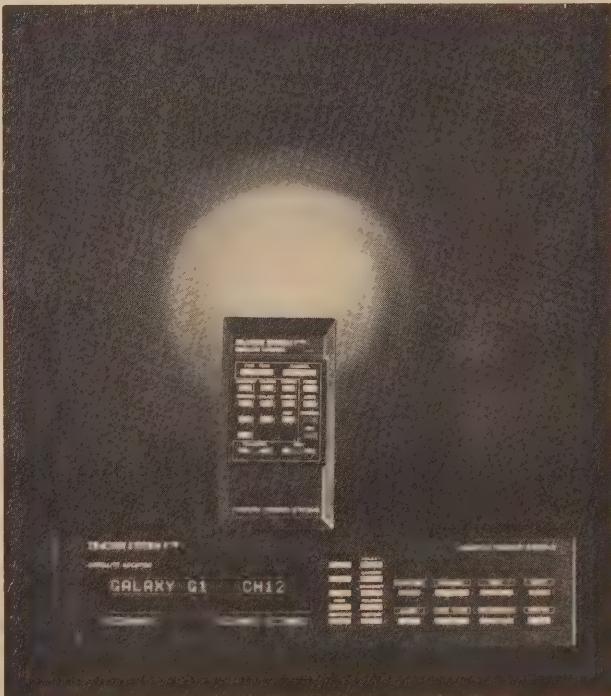




**Wish Dish** - From Birdview is a budget-minded alternative.



**Bargain** - Uniden receiver featured in under \$2,000 system.



**On Track** - Houston Tracker seen in upper-end systems.

## Great Deals

directly provide delivery or installation. (He can arrange for installation and delivery in the local area.) This means that all the following prices are *plus* delivery and *plus* installation.

Mike notes that, "People should be aware of what they are buying and who they are buying it from. Most people are confused. They hear 20 different stories from 20 different salesmen. Nobody takes the time to explain it right to them.

"My suggestion is that buyers don't go after a 'cheap system.' There are people out there who have been making terrible equipment. If it was terrible at a high price, it's still terrible when the price is reduced.

"Go after a good system. Lots of equipment has been discontinued because of technology breakthroughs. You have to find out what equipment has been discontinued and go to a reputable dealer."

### For \$895 PLUS DELIVERY, PLUS INSTALLATION

1. 10½ foot Luxor antenna. (A full 40 dB gain and a 5 year warranty.)
2. Luxor 9550 receiver
3. Luxor 9554 positioner
4. 85 degree LNA

Mike notes, "At one time, this system would have cost many hundreds more. But, the receiver does not get Ku band and it's not a block down converter. But it's a tried-and-true system that has been out there for almost three years."

### For \$1,500 PLUS DELIVERY PLUS INSTALLATION

1. 10½ foot Luxor 9910 antenna
2. Chaparral Sierra Receiver
3. 18 inch Arm positioner and motor actuator
4. 65 degree LNB
5. Polarotor 1 feed horn
6. 100 foot of cable and do it yourself parts.

### For \$1,299 PLUS DELIVERY PLUS INSTALLATION

1. 10½ foot Luxor dish
2. M/A-COM TI series receiver (made by Toshiba for M/A-COM)
3. 85 degree LNB
4. 100 foot of cable and all other system parts.

Mike points out that, "The problem with this system is that it couldn't get Ku band. The reason was that the receiver was voltage synthesized. It couldn't discriminate closely enough for Ku band. The kicker, however, is that Uniden just came out with a "55" converter that allows this receiver to pick up Ku band. So you can have it all, including price!"

### For \$1,239 PLUS DELIVERY PLUS INSTALLATION

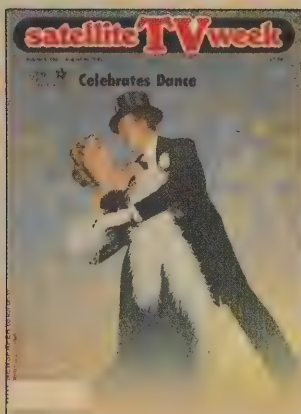
Same as above except with the H-1 receiver made for M/A-COM by Hitachi. Mike states, "It has adequate video, but is an outstanding audio performer. Includes 72 pre-programmable subcarrier audio channels!"

There you have it. From across the country, bargains in home satellite equipment are available. The programming is available (nearly 100 non-scrambled channels), the equipment is technologically sound. And the price is terrific. So what's holding you back? 🦋



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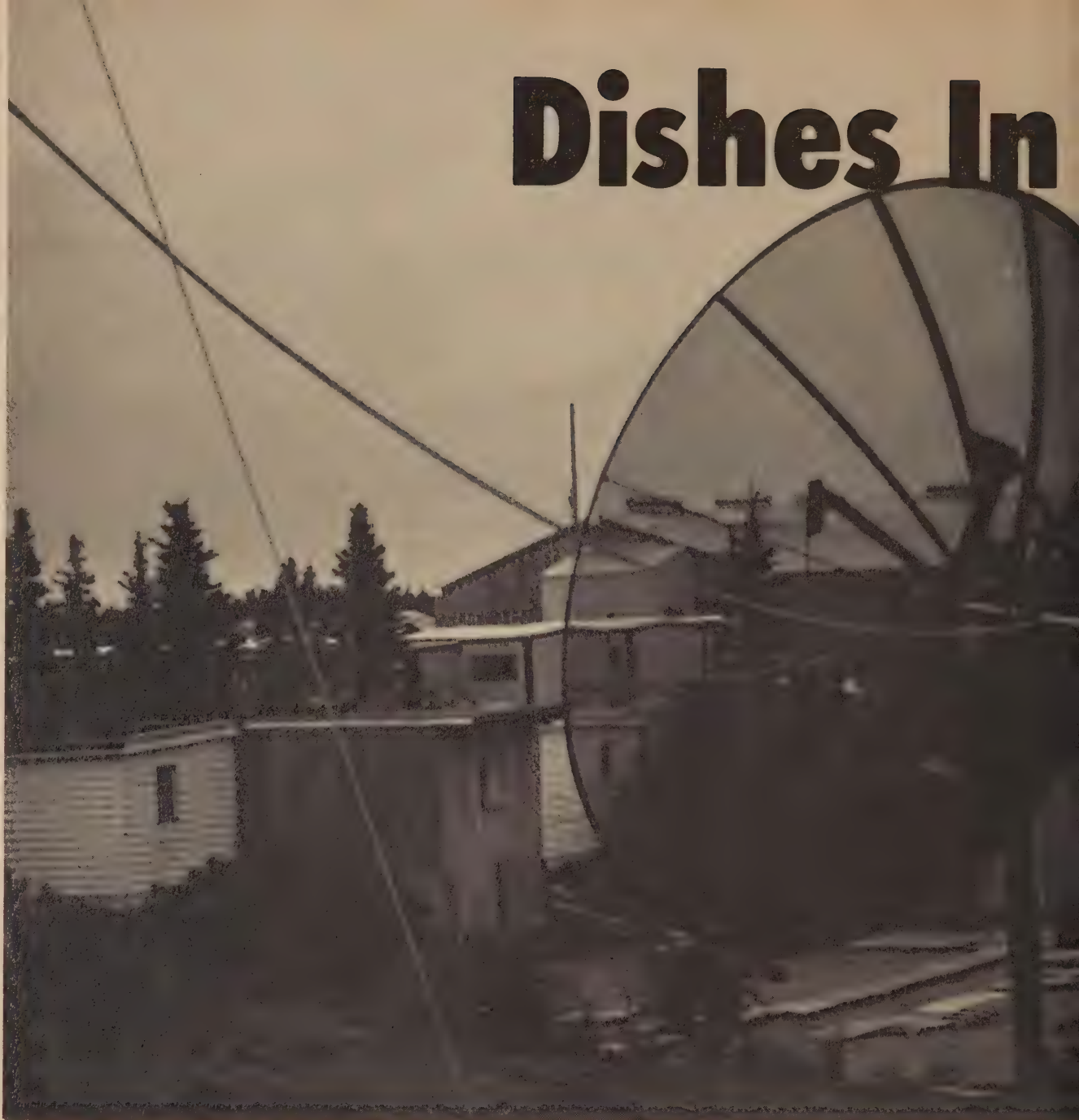
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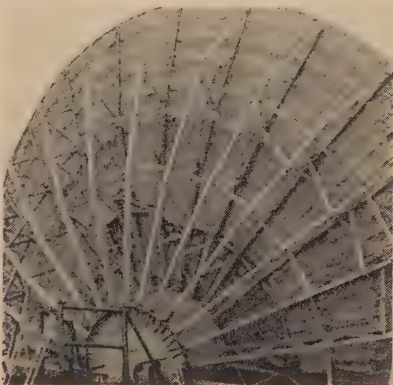
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# Dishes In



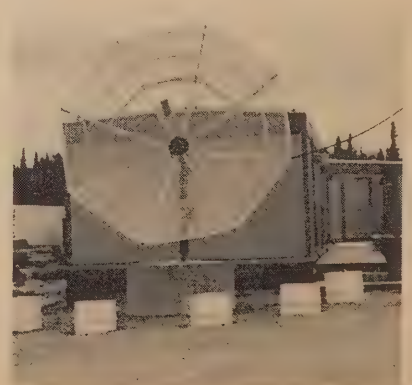
**Insulated Dish** - Extreme temperatures require special maintenance features for Alaska's dishes.



**Aimed At The Horizon** - Being so far north, the dishes have to aim low to get reception.



**Residential Dish** - At King Salmon, Alaska, a big dish is needed to pick up signals from far away equator.





# ALASKA

## *Satellite Reception Is A Necessity On The Last Frontier*



BY TIM OLIN

**T**he visions conjured up are of bears, and miles of forests; of mountains, fishing, glaciers and rugged individuals bent on being part of the last great frontier on earth. If you ever have had the wonderful opportunity to have visited that beautiful and extremely vast land, then you know of what I speak.

But it is also a land that demands and is gobbled up to a very small degree by technology. It has more airplanes per capita than any other state. It has a sophisticated method of disseminating medical treatment by radio and television off satellite. Every vil-

lage has a community dish by which Rural Alaskan Television (RATNET) is received and redistributed via VHF signals. Before July 1, 1986 "Learn Alaska" was a second channel being received by the village distribution system, however due to a poor economy because of falling oil prices Learn Alaska has fallen by the wayside. That leaves most Alaskans in remote villages with only one channel of television. Thus, more and more home satellite systems are springing up on the tundra, in the bushes and beside the rivers.

Most are mesh antennas because

they are lighter in weight than other antennas and are easy to ship. One must understand that in some of these villages everything must be flown in or brought in by barge. To get an antenna to Naknek or King Salmon may cost as much as \$800.00, no small sum. Most are at least twelve feet or larger. As you can see by some of the photos the look angle is very close to the earth.

The second reason for using mesh antenna is the wind factor. We may think the wind really blows in the lower forty eight but I can attest to the fact that it pales in comparison to some of the blows they receive up there. But I've seen mesh antennas sheared off at the hub by several days of constant winds.

It's very important to have an antenna with a very strong mount. Several people will "beef" up the standard mount that comes with some antennas so that it can withstand the sometimes brutal conditions that may develop. It is also important to make sure that a lot of cement is used for the pad on which the antenna sets. It just wouldn't do for the antenna to go sailing off across the tundra never to be seen again.

Most dish owners I've visited with in the remote areas I've been in have few complaints about losing a few channels although they harbor some of the ill feelings against some of the programmers and their refusal to ask for reasonable prices for their services. The electronics used there have to be reliable not only because its a long way to the nearest satellite store but also because of the extreme conditions weather-wise that may develop. These aren't the ideal lab-type conditions that some manufacturers try to artificially simulate. This is the real thing.

It used to be that the largest percentage of television was at least a month old before it reached viewers in the bush and much of the fare on RATNET still is. But now you can see it as it happens in full living color although you may just be eating breakfast when the big game starts. That's a minor adjustment though when you consider the alternative.

Many of the dishes also use ropes and some additional stabilization because of the windy conditions. Satellite television has been around in some form for many years but it is now really getting into the homes on the last frontier. Maybe it's because satellite television really knows very few frontiers that it can't cross. ▀









# FUN and GAMES

## *This Popular Sports Bar/Restaurant Has Some Very Special Dishes*

**O**ne is a pro football star from West Virginia, the other a one-time rugby player from England. Together they own possibly the most successful sports hangout in Southern California. Their bar-restaurant is called Legends and it's located in the Belmont Shores area of Long Beach.

The owners are Dennis Harrah, standout right guard for the Los Angeles Rams, and his friend, John Morris.

Their bar-restaurant is known for its excellent food and its famous clientele, since Harrah's teammates and other sports personalities frequent the place. It's also known for its four satellite dishes and its four large TV screens that offer round-the-clock sports.

"The dishes were the best investment we made, by far," said Morris. Legends probably was the first sports-bar in Southern California to install a satellite dish and one of the first in the country. Now, almost every corner bar has a satellite dish.

Legends has had satellite dishes since 1980.

Said Harrah: "I wanted to install a big-screen TV, but the dish was John's idea. I said OK, not knowing he wanted to buy four of 'em. As things turned out, it was a great investment."

Harrah, a mainstay in the Rams' offensive line since 1975, and Morris became friends in the late '70s when they lived near each other in Long Beach.

Morris was in the garment business, a go-nowhere job. What he really wanted to do was own a sports bar. He discovered his friend Harrah had the same idea.

The wheels started to turn. It was a natural match—Morris' brains, Harrah's name. Morris would run the place, and Harrah would help out when time permitted.

In December of 1979, they borrowed \$700,000 and bought what would become Legends.

The place wasn't exactly an instant success.

"We both thought showing sports on big screens would help draw people," Morris said. "I started to look into the possibility of having cable TV hooked up.

"A few months after we opened, I was talking to a customer who was an engineer for Rockwell about my plans. I don't even remember his name. But he gave us the best possible advice. He said, 'Invest in a satellite dish.'"

Morris remembers thinking, "A what?"

The customer gave Morris the name of a Long Beach dealer, a fellow named Tim Phillips, who had a company called Visions.

As they say, the rest is history.

Today, Morris and Harrah have \$100,000 worth of video equipment, which includes the dishes, the big screens, video recorders, stereo units and speakers and video cameras. The cameras are used to tape softball games, beach volleyball games and such.

The idea is, that afterwards, the participants will come to Legends to watch themselves and, of course, partake of food and drink.

But the big attraction remains all the sports on the big screens. Patrons know Legends is the place to watch blacked out Raider or Rams games, blacked out or tape-delayed Laker playoff games or just about any sporting event that's on TV anywhere.

"That's our reputation," Morris said. "People know, with our four dishes, we'll have all the major events. They can count on it."

A few years ago, Morris and Harrah expanded Legends from 170 capacity to 265. On days a Rams or Raider game

*Continued on page 79*

**First And Biggest Satellite Sports Bar?** - "Legends' four dishes and four giant screens have made it a popular attraction with the sporting crowd. Owners Dennis Harrah (right guard for the L.A. Rams) and John Morris combine good food and spirits to create a legend of their own. Color photos by Ambrose



# TROUBLE IN SPACE?

## *An Update Of Satellite TV Related Events ...From Space Flight To Black Boxes*

BY BOB WOLENIK

Last issue, *Home Satellite TV* reported that the explosion of the space shuttle Challenger ("Space Delay" by Tim Olin, Sept., 1986) was causing some serious concern among satellite manufacturers. The setback of the shuttle meant delays of up to a year in the launching of new satellites and perhaps delays in the implementation of the new Ku band birds.

Since then, news that the first launch of the next shuttle flight will be further delayed an additional year, perhaps into the spring or summer of 1988 has turned concern into near panic.

The problem, of course, is not simply with the space shuttle. It's the fact that within the past six months virtually all of the west's space launch vehicles have run into trouble. Both the U.S. Titan and Delta rockets have been grounded after explosions. Similarly, the European Ariane rocket, after a failure, has been temporarily grounded.

As a result there are virtually no vehicles for launching satellites available for at least the next six months. And after that there will be only limited launch capability.

The Space Shuttle, which was to have been the answer to the crunch in getting satellites up into orbit, appears to have been the hardest hit. Originally with four shuttles, there were to have been 25 launches a year or roughly one every two weeks.

Now, with challenger gone and with little chance of approval for the purchase of a new \$2 billion shuttle by Congress, that ambitious launch program is being scaled back. At hearings on the shuttle program, an unofficial estimate of 8 to 10 shuttle launches a year appeared to be more realistic (although "officially" the program is to have something like 15 launches a year). If the lower figures are true, it represents a cutback of 60 to 70 percent from the original launch program for the space shuttle.

Apparently the problem is that the launching of the shuttle is far more complex a procedure than had at first been imagined. In addition, there are not really three shuttles remaining in the fleet, but two and one for spare parts.

The real problem, according to sources both in the military and in business, however, is the backlog that the current delay is causing the military. The military has regularly launched satellites having reconnaissances and other purposes. These birds, many of which are just now being completed are suddenly landlocked. There is no way to get them into space. Consequently they are now being stored until there is a launch vehicle available. Thus, as soon as the shuttle and other space launchers are ready, these military birds will have first priority. Of course, by then the military will undoubtedly have new satellites it wants to get up.

As a result, every indication is that the military will want all the available launch capacity for perhaps the next 5 years or longer. That means that private and commercial satellites will have to take a back seat.

There is so much concern about this that the Los Angeles Times

has reported Hughes Communications, the country's largest producer of commercial satellites, is investigating the possibility of creating its own launch facilities and building its own launch rockets!

For home satellite TV viewers, the potential problems are distant. Currently, there is a surplus of broadcast capability on the existing birds. With perhaps as many as 500 transponders available for commercial broadcasting, perhaps only 130 or less are being used for commercial video transmission.

However, satellites have a limited lifespan. The solar panels get hit by debris and over time lose power. The satellites themselves are kept in perfect position by firing tiny rocket bursts of gas. Eventually, the satellites run out of this gas and then career out of control to eventually plummet back to earth.

Thus, unless new birds are continually launched, the existing fleet will slowly break down and die. The best guess currently available is that commercial broadcasting by satellite can be continued at its present level for the next five to seven years even without the introduction of any new birds. After that, however, it's anyone's guess how long the existing fleet of satellites will last.

One good note is the fact that so many of those involved in the industry are actively working to find a solution today. It's hoped that given a 5-year lead, by 1991, there will be a whole new fleet of launch vehicles ready to take new birds into orbit.

### UNSCRAMBLING?

The race to come up with the first working "black box" to de-scramble the picture is getting frantic. We've reported on the work of DES, a network of engineers and scientists who were trying to make sense out of the encryption code used by HBO, Showtime and others on the M/A-COM descramblers. As of this writing, they report little progress.

However, hardly a day goes by without someone calling our offices saying they have produced the ultimate black box, one that descrambles everything.

*Continued on page 28*

**When's Next Flight?** - *Loss of the Space Shuttle and other launch vehicles has shut down America's commercial satellite business for several years. Questionmarks are how long will the current birds last and will new launch vehicles be ready with replacements in time? NASA photo.*







# Trouble In Space?

The first question we ask is, "Does it descramble the audio?" (The video is fairly easy to descramble and many have already done it. See the cover story on our July issue. The audio, however, is far more complex.)

The answer invariably is, "Not quite, but we're almost there. A few more tweeks to the system and we'll have it." Maybe. Some, however, have suggested that the audio may never be broken.

On the other hand, some would be black boxers answer, "Oh yes, the audio works great!" According to reports by Contributing Editor and founding father of this field, Bob Cooper, that's hogwash. All the systems he's seen thus far that do unscramble the audio have just been M/ A-COM sets reboxed to look like something else.

To make these work, the so-called manufacturers have paid HBO and Showtime to address them. But, as soon as those payments stop, these so-called working black boxes suddenly turn off. This black box becomes a simple rip-off.

On the other hand, this is not to say that a working black box isn't on the way or hasn't yet arrived. A Canadian company recently called asking about the legality of selling descramblers that would compete with M/ A-COM in the open market. We referred them to a lawyer.

However, if they're wondering about selling them on the open market, does that mean that they have a viable product ready to go? A similar call was received from a possible manufacturer in the southwest.

If someone has indeed unscrambled the signal, the first steps they might want to take would be to get legal advice on how they could market it. And they'd want to keep their "invention" quiet. Could it be that the black box is already here and we just don't know it?

Of course, if it is here, is it legal for anyone to use it? Is it legal to sell a competitor to the M/ A-COM descrambler? Why not—after all, wouldn't prohibition of a competitor be an anti-trust situation? (See the legal column on black box usage in this issue.)

On another front, Brent Gayle and Frank Baylin have just published a new book called, "Satellite and Cable TV—Scrambling and Descrambling." (\$19.95 plus \$2 for shipping - 220 pages with over 120 photos, Baylin/Gale Productions, Suite 100, 1905 Mariposa, Boulder, CO 80302.)

In the book the authors undertake to explain the fundamental issues and concepts of scrambling for the layperson. Virtually all of the existing scrambling units used by cable and satellite TV are handled including the M/ A-COM Video-Cipher II and Scientific Atlanta's B-MAC system.

The authors demonstrate an amazing ability to get behind the scenes and come up with photos of testing the various systems. They also give clear and ample explanations of the theory behind how the various scrambling systems operate. What they leave out, however, is schematic diagrams and any kind of detailed instructions on how to construct a descrambler.

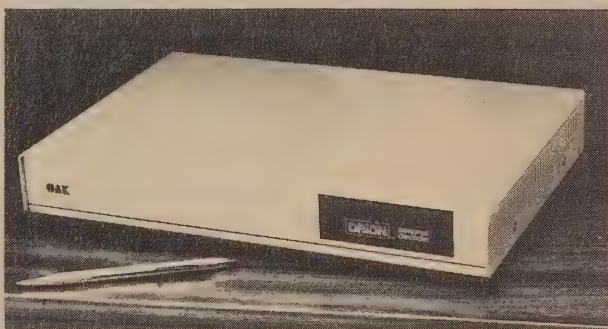
Thus, while informative, the book does not really address the issue of descrambling.

On another front, Timothy Wirth, Chairman of the Subcommittee on Telecommunications, Consumer Protection and Finance and other Senators and Congressmen continue to work for legislation to regulate the unconscionable pricing of scrambled signals. (Currently home satellite viewers with their own equipment are required to pay anywhere from two to four times as much for the same programming as are cable viewers who rent their equipment.) A timetable for legislative action, however, has not been set.

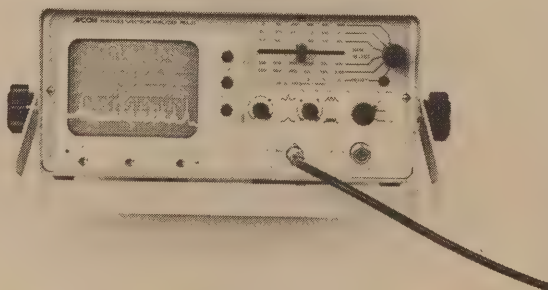
The true response to scrambling, we feel, was best expressed by one dealer who sells satellite systems. "Scrambling is here to stay," he commented. "But so what? When buyers see what else is available up there that isn't scrambled, they don't care. After all, if they want to see movies, why pay for a premium channel? For a buck or two they can rent all they want at their local Video rental store!"



**In Production - M/ A-COM descramblers on line.**



**Descrambler Alternative - Oak/Orion used in Canada.**



**Getting The Signal - Spectrum Analyzer fine tunes dish on channels that are scramble-free.**



# They WON'T Scramble

*All These Free Channels Prove That You Really Don't Have To Have A De-Scrambler*

**D**uring the first three quarters of 1986, there has been much discussion and not a little controversy surrounding the announcements and implementation of satellite programmer scrambling. Various cable service firms have gone out of their way to focus your attention on what they perceive to be a shortage of programming because a *small number* of satellite services are committed to scrambling their services. This is a call for "equal time" in the media, to present the argument that while certainly some desirable services have elected to scramble or announce scrambling plans, there are still far more benefits to owning a home dish system without a de-scrambler than owning one with a de-scrambler.

Anyone who makes a list of programming services on satellite comes to a slightly different conclusion than others making seemingly identical lists. That's because there is a constant ebb and flow of satellite services beginning, and ending, service via satellite. In any given week two or three new services will begin a programming operation and one or two will cease operation. The vast majority of these pass essentially unnoticed except by those satellite introverts who spend 15 to 18 hours per day dialing their receivers around from channel to channel and swaying their dishes back and forth in search of new satellites and new programs. And, a list I might prepare today will be out of date next week no matter how careful I am with my list making activity today.

Suffice to note that in a typical week, if you devoted between 15 and 18 hours per day to dialing your receiver around and sweeping your dish through the heavens, you would count upwards of 130 separate, identifiable



**Country Music TV (CM-TV)**  
- features western videos.

**BY BOB COOPER, JR.**

television programming services in the air. Some of these, such as *The Silent Network* (F4, TR8) operate for abbreviated periods each week. "TSN" features specialized programming for those who are deaf or hearing impaired, and they typically telecast two hours per week on Saturday mornings. There are dozens of these specialized "short broadcast" networks in operation, and if you have a special interest or a special problem in your family, any one of these networks would be worth the price of a dish all by itself. For example, there is the *Computer Distribution Network* which broadcasts for approximately 90 minutes every weekday afternoon (G2, TR5). They feature hard hitting demonstrations of computer equipment and discussions of new computer software. Or there is *Saturday Night Satellite*, found on Spacenet (TR21) which focuses on country music and new talent in the country and western field. I'll provide a few tables for you here so you can study the great variety of programming found on little known and seldom recognized satellite services. I think you will be surprised how much programming there is on satellite which is not only *not scrambled* but which promises never to scramble at all.

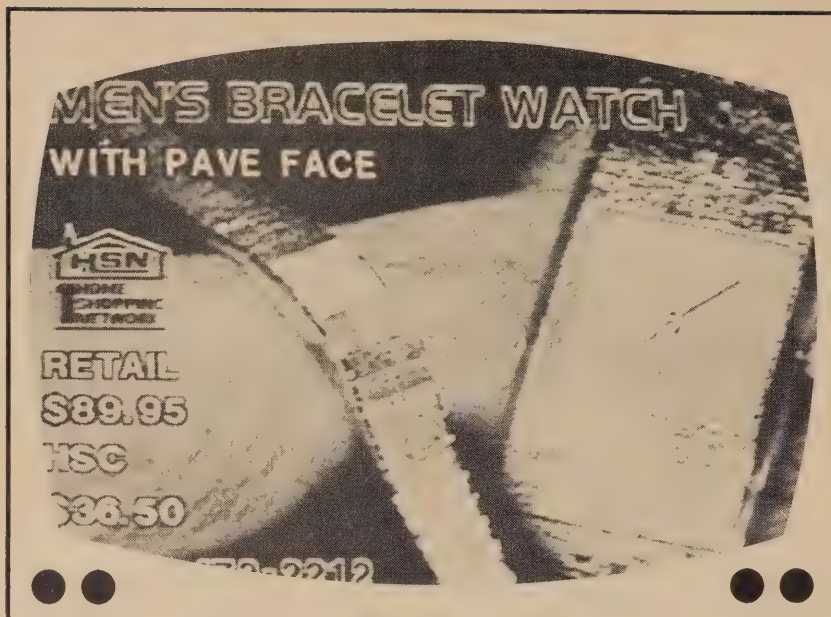
The truth of the matter is that if you

count the number of services who say they will never scramble, you see there are more than four of these services for every single service that is scrambling or promising to scramble. Furthermore, if you count the number of hours broadcast by these never-to-scramble services, you will find they total more than 2.5 to 1 over the hours telecast by those who have scrambled or promise to scramble. Owning a satellite dish is your entry to programming services that you will never see on local television, nor on cable television. Part of the reason why is the economics of satellite.

An example, and one which you should be watching every week if you already own a satellite dish: The program is *BORESIGHT* and it broadcasts each Thursday night on Spacenet 1, transponder 17 at 9 p.m. eastern time. The group behind this program are semi-professional video and news enthusiasts who have been on a fast learning curve to become a credible source for information and news in the home dish field. "Boresight" means something special in the satellite jargon; it describes a point on earth where the satellite signal is strongest, most easily received. "Boresight", the television program is all about the latest developments in technology, programming, and news by and for the home satellite industry.

It is no easy undertaking to put together 60 minutes of brand new, informative television each week. Ask the people at "Sixty Minutes" how they do it, with a per-show budget of nearly \$1,000,000. Now scale that down to two enthusiasts with Sony cameras and 3/4 inch portable tape decks, throw in a couple of recent female journalism school graduates and bunch them all up in the corner of a satellite





Home Shopping - highly popular for bargains.

## Won't Scramble

TV dealer office in mid-state New Jersey.

Mix it all up in a weekly pot and you have Boresight, every week for more than two years now, operating on a shoestring budget of perhaps \$3,500 per week. And that includes the "satellite time" the program must purchase in sixty minute chunks each week. Boresight, our example out of many dozens of examples, has managed to stay "on the air" in spite of never really catching on in the sale of advertising because of intensely loyal viewer base. And it has attracted this loyal viewer base because it has worked hard at bringing issues of interest to their viewers (such as scrambling of satellite signals) week in and week out.

The cost of bringing programming to satellite has plummeted in recent years. A single hour of satellite time, ten years ago, brought to the satellite uplinker such as RCA cost upwards of \$1,800 to have "broadcast". Unfortunately, ten years ago there were virtually no receivers out there to pick up such telecasts so naturally not many people were standing in line to make such transmissions. You can shop around and find an hour of satellite time now for under \$300, or even less if you are willing to take your time in the "off-peak" hours say between 12 midnight and 6 a.m. Let's try some simple math to see how cost effective that can be:

1) The post office will allow you to mail a number 10 envelope containing

four sheets of paper for 22 cents. On those four sheets of paper you could type in approximately 1,800 words. If you sat down to read those 1,800 words out loud and you didn't stumble around, you could read them aloud in around 12 minutes time.

2) If the paper was free and if the envelopes were free, and you only paid for the 22 cent stamps, you could send that letter to 1,364 people for \$300.

Therefore, for the cost of making up a four-page letter to 1,364 people, you could be transmitting a full hour of television to 1,364 people. Now the beauty of the "system"; the cost of \$300 can be applied to the first person and then every person thereafter who "tunes in" does so free of charge. Or, to be simplistic about it, if you reached 1,364 people for 22 cents each, you could reach 2,728 people in 2,728 residences for half that cost each or 11 cents each. In other words, the larger the audience, the smaller the cost to reach increments of audience.

The satellite system is unique with these features; it is nationwide, capable of being worldwide, "live" and simultaneous through all of North America for a very low incremental cost. These are some of the reasons why so many "Boresights" and "Silent Networks" and "Computer Distribution Networks" are today alive, well and attracting small but intensely loyal viewer groups. And this is a part of the reason why your investment in a home dish will never be threatened by the

cable firm's greed and desire to scramble all of the "mass programming" such as HBO. The programming we are talking about is the exact opposite of "mass appeal"; it is "vertical interest programming" directed at special people or special businesses with an interest in or a need to know about some particular aspect of American life.

As a matter of fact, if you have a hobby or vocational interest of your own which is not presently "served" by a television network or a television program, there are hundreds of opportunities out there just waiting to be put together. The list is almost as long as the dictionary; stamp collecting and coin collecting, two very popular investment hobbies receive virtually no television interest. People who play bridge have no network of their own. Nor do people who ride bicycles or hike trails on weekends. The very fabric of what it takes to create a television program for people with a special interest has changed dramatically with the proliferation of satellites and low-cost dishes. I find it difficult to believe that people who spend \$10,000 buying and restoring a classic car would not invest \$2,000 in a home dish system if they could receive tips on restoring cars and case histories of restoration projects a few times in a week "on their own network." I also believe that people who play bridge every Saturday night would be interested in watching professionals in bridge give them pointers on the game a few nights per week via satellite television.

In any specialized interest area, "information" is always difficult to find and very often expensive to obtain. The satellite system we have today has the capacity to revolutionize the way we distribute information. That "revolution" is already underway in some areas of commerce and hobby interest. I predict that this will have more to do with the ultimate growth of the home dish industry than all of the HBO movies or CBS newsfeeds combined.

First we have the satellites. There are now 23 of the "C band" satellites in operation. Only a few of these have less than the normal 24 channels so we have more than 400 of the "C band" channels available for television. Prices per hour, for satellite time, vary but for the home dish owner there are no satellites truly out of reach so if he has to tune in his Corvette restoration program on Thursdays on Galaxy 2 at 7 p.m., Boresight at 9 p.m. on Space-net 2 and his bridge tips on Satcom 1R



on Saturday nights at 10 p.m., there is no real inconvenience to the private dish owner. Each of these satellites, and the other 20 not mentioned are but memory points on his dish controller system. Even the most popular satellites such as Galaxy 1 and Satcom F3R have many tens of hours each day when their cable programmers are not using all of the channels available. In other words, at the present time there is a "buyer's market" for satellite time and the normal rate will be in the \$300 per hour region; or less.

Next we have the proliferation of semi-professional and even high grade amateur video production equipment. Sure, Boresight *could* spend 450,000 each week on producing their show. Or they could spend \$1,000,000 a week as "Sixty Minutes" does. But the fact remains they do it for \$3,500 or less per week and it looks darned good! No, you don't need an uptown studio and a trailer loaded down with expensive equipment to put together an impressive, informational one hour each week on a subject you really understand. The secret is that if the "right people" do the production, there is a marriage of "love" for the subject and a dedication which no union-hourly-rated technician will ever have for a production.

*An example.* Way back in 1978 I produced a one hour program every two weeks for the cable television industry. It was a "news magazine" program dealing with technical topics of interest to cable engineers and managers. We produced the program in the

studios of the University of Oklahoma where we used junior, senior and graduate student interns to run all of the equipment. Their instructor was always hovering nearby to see that everything went smoothly. It took us three to four hours every two weeks to do the show and the total cost for producing the program was under \$300 per show. I'd bet you could take the right concept for a show on bridge playing techniques into your local state college or university production center and explain that you wanted to transmit the program on satellite; and walk out with an agreement to produce the show for not much more than \$300 per episode.

Production techniques, then, can be whittled down every bit as far as satellite air time has dropped in recent years. Now, *publicity* for the vertical interest programming.

Every shop that sells bridge supplies would help you promote a weekly show on bridge. Magazines that cater to bridge players would probably be willing to provide their "experts" to work on the show, in return for some publicity for the writers and their magazines of course. Even the satellite TV guides would be willing to publish "vertical interest programming information". Cross promotions are possible. Take your programming concept and a program or two on tape to a few major suppliers of dish systems such as Uniden or Cincinnati Microwave. Explain to them that with their cooperation, you would help them reach a brand new market of TVRO dish buy-

ers that they might not otherwise reach. The dish manufacturers might even be smart enough to tie their own local dealers, and the shops, in each area that cater to and sell supplies for special interests together. The best first-line customers for dishes in our example would be all of the stores and shops that sell bridge playing supplies. If having *The Bridge Network* in their store helps them sell more bridge supplies and allows them to reach a larger market, they would be foolish not to become a part of the project.

In all of these examples and for those examples we have not bothered to use in illustration, there is something far more important to consider than whether HBO is going to scramble or not. *And that is programming content*; if you can program to reach the special interests of people who are now missed by the general interest programming, then you have a "sales tool" that will help you ring up new TVRO system sales and create new, non-cable-oriented excitement for the home dish industry.

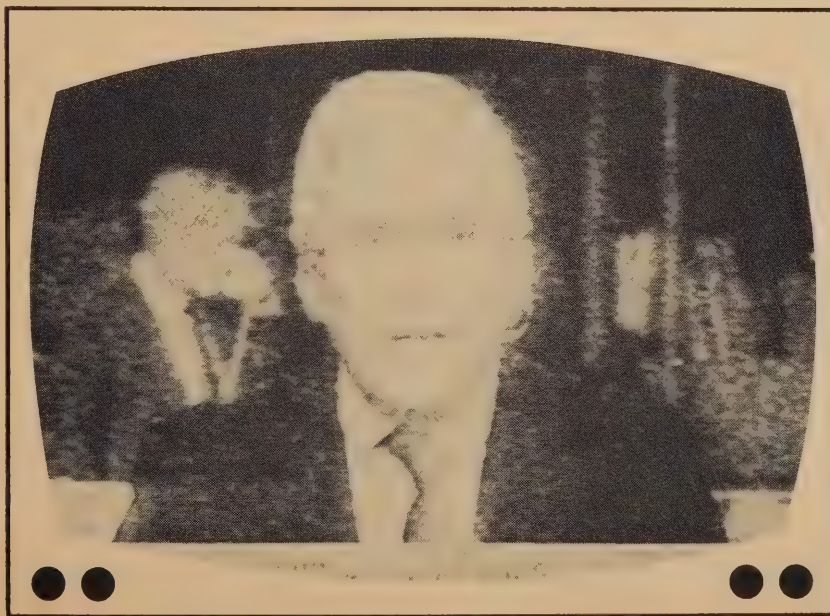
#### **MEANWHILE/ This Is Already There!**

To this point in the home dish evolution, TVROs have been sold largely because of the *broad spectrum* of pure entertainment they provide. You count the number of movies per week by the hundreds, the number of baseball games in the tens and the hours of news in the thousands of hours per week. Owning a TVRO has been the world's greatest ticket to entertainment in the home since the invention of broadcast radio.

Of course inter-mixed in all of this non-stop entertainment there has always been a sizeable sampling of special interest programming created for people who are not turned on by the latest Bette Midler flick.

**Country Music:** "The Nashville Network" still pumps out 24 hour per day programming (Galaxy 1, TR2) without scrambling. They *may scramble* someday because of close cable ties. "Country Music Television" (CM-TV) features non-stop country and western videos, 24 hours per day (T303, TR1). For the pure country fan, this is a superior service since TNN has reduced country music content to a minimum. "Saturday Night Satellite" is a 90 minute weekly program (S1, TR21) that leans towards country content. On the audio-only side, there is "Country Coast-To-Coast" (G1, TR3, 5.94 and 6.12 MHz subcarrier); "Studioline Hit Country" (G1, TR13, 7.38

**Financial News - Plenty is available.**





# Won't Scramble

and 7.56 MHz subcarrier); "Starship Country" (F3R, TR6, 5.41 and 5.94 MHz subcarrier); CKRW-AM (AD1, TR23, 5.41 MHz).

**Movies:** The quantity of movies available, unscrambled, *remains mind-boggling*. There are still hundreds per day not scrambled and additional scrambling will not change that fact. Granted, the movies available may be older but they also tend to be more "classic" oriented since the selection of older movies is far better (simply because of quantities available) than for the newer movie releases. *The following services have no plans to scramble.* Home Theater Network (HTN), recent release movies 4 p.m. to 4 a.m. F3R, TR16; Black Entertainment Television (BET), movies oriented to blacks mixed with other ethnic programming (F3R, TR20); Arts & Entertainment (A & E), movies plus drama specials (F3R, TR24); Nustar Television Network (NTN), movies plus sports and variety for home dish owners with advertising support, (S1, TR13); Caribbean Satellite Network (CSS), movies and a few off network "classics" such as Peter Gunn (W5, TR16); BRAVO featuring international award winning films 7:30 p.m. to 5 a.m. eastern (F4, TR2); "American Movie Classics" (AMC) with movies released prior to 1970 (7 p.m. to 7:30 a.m.; F4, TR10); "The Nostalgia Channel" with older films, film clips, comedy routines (F4, TR21).

**Network Services:** There is plenty of confusion concerning the ultimate role to be played by the three major commercial networks in the United States, and the scrambling situation. For now, there is plenty of network fare available on satellite and in the next few years it is unlikely this will change. There are also plans afoot to bring at least one fulltime network service to home dish owners, via satellite, so that if ultimately the network feeds do scramble themselves, one or more of their affiliates will put the same programs "back up" on satellite in a home-dish-owner available mode. For now and for the foreseeable future, we have the following network services available:

**ABC:** Available on C band, T302 (TR10), T301 (TRs 10 and 12). ABC is also available with the assistance of an Oak Orion descrambler on TR10 of Anik D via affiliate WXYZ in Detroit.

**CBS:** Available on C band, T302

(TR20), T301 (TR2). Service on T302, TR16 is test scrambled. Service also available with Oak Orion descrambler on TR23 on Anik D via Detroit affiliate WJBK.

**NBC:** Available on C band, F1R, TR8 fulltime. Also available on Ku band, RCA Ku-2 TRs 1, 3, 5, 9, 11, 15 as well as through Anik D, TR9 (Detroit's WDIV).

**PBS:** Available on C band, W4, TRs 15, 17, 21 and 23. Also available via Anik D, TR21 via Oak Orion descrambler (Detroit's WTVS).

The networks also feed plenty of sporting and news events on a long list of transponders (omitted here for clarity) and the best of all three networks plus CNN and CNN Headline service can be found unscrambled on Satcom F2R, TR22 courtesy of the American Forces, AFRTS channel.

**Sports Services:** Although the cable-basic sports service (ESPN) has made a commitment to scrambling, and their Canadian clone TSN (The Sports Network) is already scrambling using the Oak Orion format, there remains a tremendous amount of sporting coverage unscrambled and as far as we can tell, it is not likely to scramble soon. True, the baseball owners are *considering* scrambling of the so-called backhaul feeds (from an away stadium back to the city where the team calls home) but to this point no firm decision nor time table has been selected.

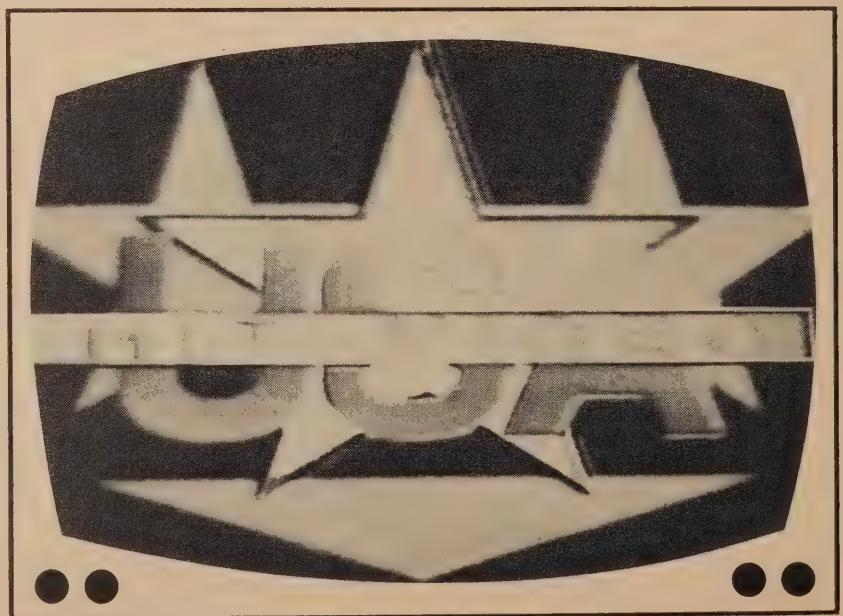
Recently a Canadian company claimed success in "breaking" into the Oak Orion scrambling format and they have been shipping from various US

outlets a "chip set" which it is claimed will plug into your Oak Orion descrambler and cause all of the Oak scrambled channels to unscramble; both audio and video. This has impact on two areas. Within Canada, the Oak Orion scrambling format is used extensively on the Anik D cable and home scrambled service offered by Canadian Company Cancom. The Canadian firm has been offering private, home subscriptions to their scrambled service for around \$20 (US dollars) for 8 to 9 channels. Four of these channels originate in the USA, as we noted, and make-up the basic network service for the USA. The remainder are the Canadian equivalent of the US "super stations".

Within the United States, the principal users of the Oak system are the horse racing channels fed from locations such as Atlantic City (W4, TR6) to race and betting parlours primarily located in Nevada. Other users of the Oak scrambling system include the Catholic Telecommunications Network of America (CTNA) and the Hospital Satellite Network (HSN).

The user net pricing for these chip sets is around \$350 (US). The Canadian creators are quite certain they cannot sell these chip sets within Canada for there are Canadian laws which preclude such activities. They are less certain about whether or not these chip sets can be sold in the US provided the buyers only use the chip sets (and the required Oak Orion "P" series descrambler that the chip sets plug into) to tune in "foreign" (as in

## Unscrambled Music Videos - A clone for MTV.





Canadian) transmissions. Thus there is a "legal danger" associated with purchasing any such chip sets at this time and if you are tempted, you should at least be concerned about whether or not a law is being broken by your using such descrambler-defeating chip sets.

Strangely enough, *if you are outside of Canada or the United States*, you would be violating no laws if you purchase and use such chip sets. The primary attraction to such chip sets is that the manufacturer claims permanent turn-on of all (Oak scrambled) signals when the chip sets are installed in an Oak Orion "P" series descrambler.

#### ALSO/Already There!

MTV has announced its intention to scramble. There is at least one "clone service" now available on US satellite  
*Continued on page 78*



**Clear Weather** - if you have a satellite system.

## FOLLOWING SERVICES ARE UNLIKELY TO EVER SCRAMBLE

#### Educational

Learn/Alaska Television Network (F5, TR24)  
NASA Channel (F1R, TR13; F2R, TR13)  
The Learning Channel (F3R, TR2)  
PBS/Public Broadcasting Service (W4, TRs 15, 17, 21 and 23)

#### Religion

PTL Satellite (G1, TR17)  
Trinity Broadcasting Network (F3R, TR3)  
Eternal World Television Network (F3R, TR12)  
Niteline Television Network (AS1, TR2)  
The University Network (W5, TR2)  
American Christian Television System (S1, TR15)  
Word of Faith Satellite Network (W4, TR6)  
Rock Christian Network (F4, TR3)  
Liberty Broadcasting Network (F4, TR7)  
The Heartbeat Network (F4, TR12)  
National Jewish Television (F4, TR12)

#### Broadcast Networks (Commercial)

Spanish International Network (G1, TR6)  
Financial News Network (F3R, TR4)  
XHITM/Mexico (M1, TR2)  
XETV/Tijuana (M1, TR4)  
XHDF/Mexico (M1, TR8)  
XEW/Mexico (M1, TR14)  
CBC North/Pacific Time Zone (AD1, TR11)  
CBC French/Eastern Time Zone (AD1, TR15)  
CBC North/Eastern Time Zone (AD1, TR19)  
CBC Montreal (AD1, TR20)  
CBC French (AD1, TR24)  
World Communications (T301, TRs 9, 21)  
The Independent Network (W3, TR21)  
BizNet, The American Business Network (F4, TR6)

#### Movies/Short Features

Black Entertainment Television (F3R, TR20)  
Nustar Television Network (AS1, TR11)  
The Movie Network (S1, TR13)  
Caribbean Satellite Service (Network) (W5, TR16)  
American Movie Classics (F4, TR10)

#### News/Current Events

C-Span House Coverage (G1, TR13)  
C-Span Senate Coverage (F3R, TR19)  
The Weather Channel (F3R, TR21)  
CBC (See CBC listings under broadcast networks)  
PBS (See PBS listings under educational)  
CNN Bureau Feeds (W4, TR16; W3, TR5)

#### Shop By Television Services

Home Shopping Network (F3R, TR22)  
Home Shopping Network (2) (F4, TR1; F3R, TRs 2, 16)  
American Wholesale Shopping Club (F4, TR10)  
Television Shopper's Showcase (F4, TR14)

#### Miscellaneous Services

Galavision (Spanish entertainment) (G1, TR20)  
CMTV/Country Music Television (T303, TR1)  
Healthcare Information Network (S1, TR9)  
Saturday Night Satellite (S1, TR21)  
Canadian Parliamentary Network (AD1, TRs 16, 24)  
KSCI Computers (W4, TR9)  
Senate Republican News Feeds (G3, TR8)  
The Silent Network (F4, TR8)  
Hit Video USA (F4, TR18)  
Computer Distribution Network (G2, TR5)

#### CHANNELS WITH NO ANNOUNCED SCRAMBLING PLANS\*

*\*but Coop thinks they eventually will scramble.*

#### Galaxy 1 satellite (134 west)

The Nashville Network (TR2)  
USA Network (TR21 and TR9 of F3R)  
The Discovery Channel (TR22)

#### Satcom F3R satellite (131 west)

Nickelodeon (TR1; also FR, TR4)  
Video Hits (TR15)  
Lifetime (TR17)  
Arts & Entertainment (TR24)

#### Westar 5 satellite (122.5 west)

PASS (sports) (TR8)

#### Telstar 301 satellite (96 west)

ABC Network (TRs 10, 12)

#### Telstar 302 satellite (86 west)

ABC Network (TR10)

#### Satcom F4 satellite (83 west)

BRAVO (TR2)  
Home Sports Entertainment (TR5)  
Madison Square Garden Events (TR6)  
Sportsvision (TR9)  
Homes Sports Entertainment (TR11)  
New England Sports Network (TR13)  
Prime Ticket (TR20)  
The Nostalgia Channel (TR21)  
Home Team Sports (TR22)  
Sports Channel New England (TR23)  
The Playboy Channel (TR24)

#### Satcom F1R satellite (139 west)

NBC (TR8)



# Upgrading To Ku

## Step-By-Step To Band Conversion

**J**ust a year ago the idea of using a dish to get more than one frequency band would have seemed preposterous. All the programming was on C-band (around 4 gigohertz). All the dishes were built and designed to receive that range.

However, times do change. Hughes satellite systems has announced that they believe that the higher Ku band (around 12 gigohertz) will be the wave of the future. At least one major network has begun broadcasting at the higher Ku band (in part to prevent easedropping on its signal from satellite owners who only have the lower C-band) and as many as 20 other programmers are currently offering some kind of Ku band fare.

To put it mildly, Ku band seems to be coming on strong. But why?

As noted, one reason may be to prevent easedropping on signals. That, however, must surely be a short-lived hope as conversion to Ku band by current users will certainly happen as more programming appears on that frequency.

Another reason, according to Dr. John E. Koehler, executive Vice President of Hughes Communications Incorporated (which launches the preponderance of the satellites) is Direct Broadcast by Satellite. He feels that more powerful satellites soon to come will be able to offer broadcasting direct to the public at a reduced cost. The reason being that the Ku band dish need only be about three feet across, as compared to the more cumbersome six to 12 feet required for the C-band dish.

While more powerful Ku band satel-

lites are being awaited, there are currently several Ku band "birds" already in orbit which are transmitting this frequency. Consequently, there has been a rush to get onboard this latest technology.

### GETTING THE LATEST TECHNOLOGY

For the buyer of a home satellite system, the step up to Ku band has proved a dilemma. On the one hand, there is not really enough programming currently available to warrant buying a strictly Ku system. On the other hand, within a few years virtually ALL programming may switch to KU. It's much like the audiophile of about 20 years ago who was buying a Hi-Fi system. Everything was broadcast (and played) in Hi-Fi. But the talk was that "stereo" would soon become the standard. Buyers, therefore, felt compelled to purchase systems that were "stereo" even though at the time the new technology was not really in place.

For the current user, the one who already has a C-band dish, the controversy is even greater. Should the current dish be converted to accept both C-band and Ku band? Can it be? Or should the user buy a separate new Ku band system? What to do? (See the related article in this issue on the topic by Bob Cooper, Jr.)

It has been estimated that only about 2 percent of current home satellite owners have systems capable of capturing Ku band signals. But that number is growing. Most are opting for the usually less expensive method of conversion. Converting means keeping the existing system, but converting it to Ku band.

### DOES CONVERSION REALLY WORK?

The trouble is that there is enormous controversy over the ability of C-band dishes to receive Ku band signals. For one thing, Ku is a much higher, hence physically thinner frequency. This means, say some experts, that some mesh dishes, while reflecting the C-band signal, will allow the Ku to go right through. (This problem has generally proven to be far less serious than at first thought.)

Another problem frequently discussed is tracking. It's possible to be quite sloppy in tracking the satellite belt (located 22,300 miles above the equator) when using C-band. The wider C-band signal is quite forgiving of tracking systems that aren't really that accurate.

Ku band, on the other hand, requires extremely accurate tracking. If the dish is off only a fraction of a degree it can mean the difference between a terrible (or no) signal and an excellent one.

Finally, there is the matter of the receiver. To get Ku band requires a Ku

*Continued on page 36*

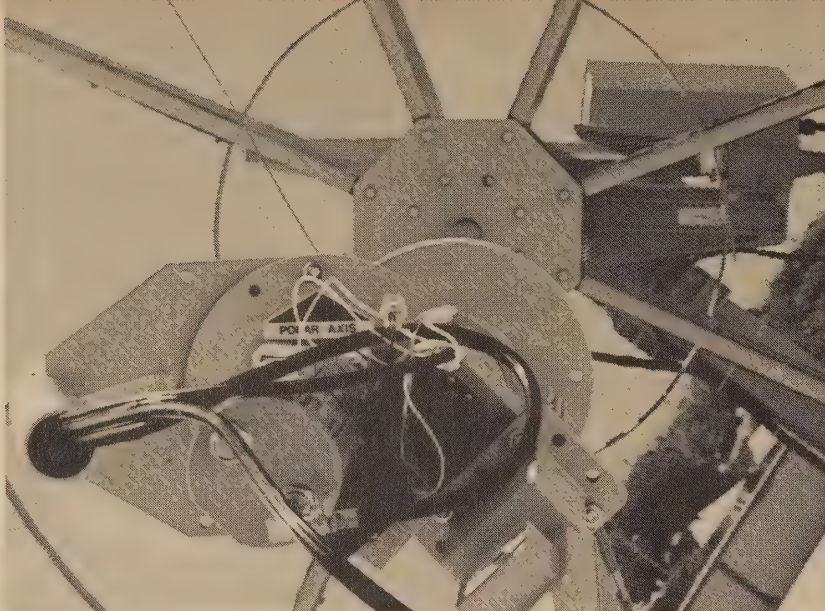
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**Critical Adjustments -** *Correctly positioning the Ku/C-band feedhorn (top) for proper tracking and then using a spectrum analyzer to peak the signal is Wiley Reed of Chaparral Communications. Ku-band is far less forgiving of "sloppiness" in the system than C-band and requires exacting installation.*

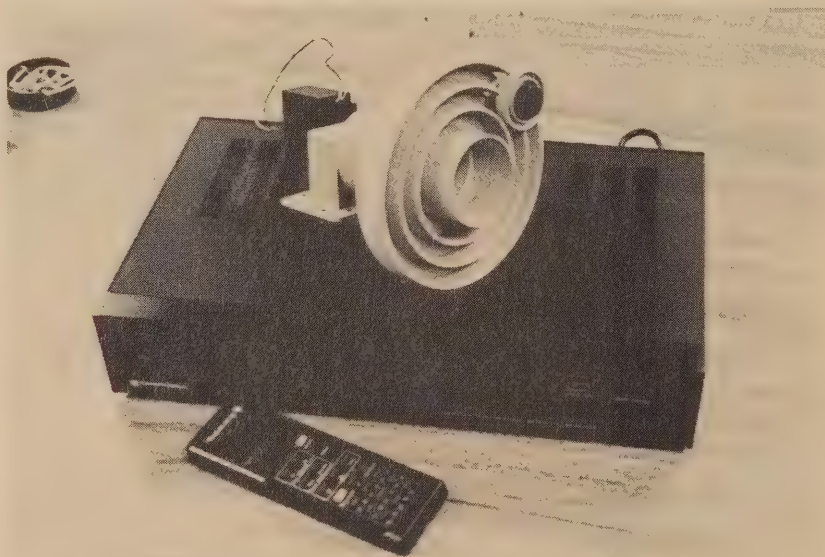




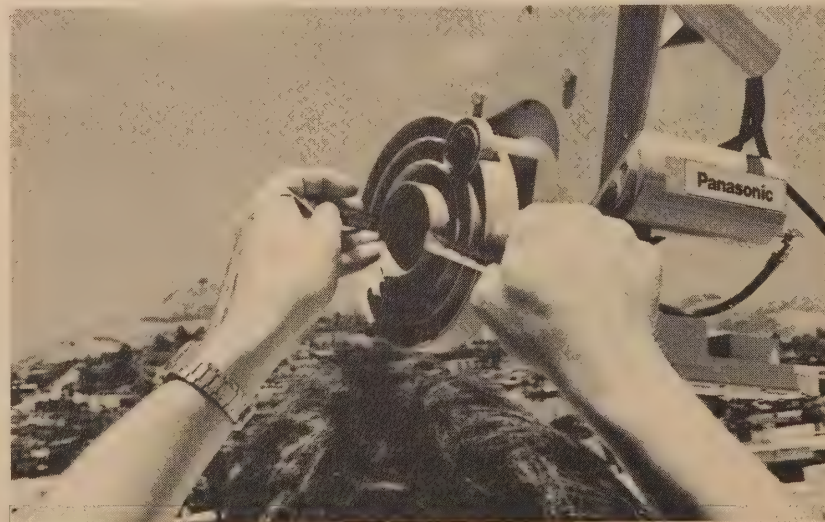




**Back-End View** - Wiring and positioning of the Chaparral feedhorn showing both the Ku-band LNA and the C-band LNB as well as the multi-cable.



**Ku/C-Band system** - Featured for this installation was a Chaparral dual feedhorn and a Sierra receiver with remote. Existing cables and connectors were used.



**Critical Adjustment** - Depth of feedhorn from dish must be exact for sharp focus.

## Upgrading

band receiver or an adapter for an existing C-band unit. (Not all C-band units can be adapted to Ku band.)

Given all the problems and the questions regarding Ku band, we at *Home Satellite TV* magazine felt that it was time to do a little on-the-spot testing. Just what were the problems and the realities of Ku band conversion for the average system owner?

To help answer these questions we invited Chapparral Communications to convert our current C-band system up to Ku. They accepted the challenge.

### CONVERTING HOME SATELLITE TV'S SYSTEM

Chapparral makes the Sierra, one of the most highly regarded C-band and Ku band compatible receivers. It also makes a dual C-band/Ku band feedhorn.

We suggested to Chaparral that they send down the equipment and we at the magazine would hook it up. They down-played that idea fast pointing out that setting up for Ku band was tricky. They preferred to have an expert do it, particularly if it was going to be written up in an article.

Thus around noon one day last month, Wiley Reed from Chaparral appeared with the equipment and immediately set about the conversion. The accompanying photos tell the story.

Wiley immediately went to the roof where we have a 12-foot Paracclipse CD antenna. He removed the Paracclipse shroud and the existing feedhorn (which gathers in the signal reflected by the parabolic dish) and LNB (which amplifies the signal for transmission over wires to the receiver).

It took nearly two hours of carefully assembling the Chapparral feedhorn assembly to the dish. A Panasonic Ku band LNA was used while the existing Avcom C-band LNB was kept. (This proved to be a tactical error.)

The distance of the feedhorn from the dish had to be readjusted since the new assembly was slightly larger than the old one. (The adjustment was necessary so that the dish correctly "focused" the signal at the feedhorn.)

Next, the "offset" had to be determined. When using two feedhorns on a dish, obviously only one can be at the exact center focus point. The other, of necessity, must be slightly offset. Because Ku band is more critical, the Ku feedhorn was positioned exactly at the focal point of the dish.



Next the location of the C-band feedhorn had to be determined. Wiley explained that it had to be exactly 90 degrees perpendicular to the polar axis of the dish. At first this sounded like technical gobbledygook. But upon examination it was simple to understand and vital information.

The dish tracks across the sky following the satellite band. The center focus Ku feedhorn will obviously track right along with the dish. But, the offset C-band feedhorn will only track across the sky if it is placed parallel to the band. If it is placed in some other position as the dish tracks, the feedhorn will get only part of the reflected signal. In other words, its movements must mimic those of the satellite's. (See the enclosed diagram.)

To accomplish this we determined the polar axis of the dish. This is simply the axis on which the dish pivots. Wiley marked two ribs of the dish between which was the polar axis and we were set.

Then using a finder built into the Chaparral feedhorn, we aligned the C-band offset. It took about 15 minutes of standing back, gauging distances with our eyes, readjusting and finally rechecking before we had it perfect.

#### HOOKING UP THE SYSTEM

Now we moved inside to the lab room. Here Wiley hooked up the Chaparral receiver. Using a signal analyzer he focused in on a satellite being sure he was right on peak signal. Then he turned on the TV. The result—no picture.

After a few moments of panic, we determined that the problem must be the TV set. It was a monitor and we scrambled for a while plugging and unplugging various jacks all to no avail. Then the entire system was checked. Still, nothing. Finally, as a reference, the previous system we have been using, a Prostar was connected—a strong picture!

Appearing slightly red-faced, Wiley concluded that perhaps there was a glitch in the Chaparral receiver. He said it had never happened before, but there was always a first time.

He disappeared and about half an hour later appeared with another Sierra. It was quickly connected, but the result was the same—still no picture. Since the chances of there being two receivers on the glitch were just about zero, we concluded that the real problem was something we had done in the installation. Back up to the roof.

It turned out that our previous receiver,

the Ramsey prostar, used a 750-1400 cycle LNB. However, the Chaparral used a 1400 to 2,000 cycle LNB. Thus the existing LNB which we were using simply wouldn't send the correct frequency to the receiver.

Wiley disappeared for another half an hour and returned with a new LNB of the correct frequency. He plugged it in and we went inside to check it out. A perfect picture on both Sierras. There had been nothing wrong with the receiver.

The signal we were receiving was from an offset C-band LNB. As a re-



**Re-adjustment** - Installing Ku band requires more precise tracking of dish.

sult, it wasn't quite as strong as had been the signal we had previously received from the center focus LNB we had been using.

For Ku band, the signal was there, but it really wasn't all that clear. Wiley pointed out that this was usually the case when the system was first hooked up because we had not yet realigned the dish. "Alignment for C-band can be pretty sloppy and still get a good signal. It is critical, however, for Ku band."

That meant another trip to the roof, jiggling the dish and time spent with the analyzer peaking the signal. The trouble was that it was now five o'clock. Wiley had been working for five hours straight and had to catch a plane back to Chaparral. It was also

time to close our offices. Plans were set for a return the following week to finish the set up.

Eventually the dish was peaked. This involved adjusting the declination of the dish until it zeroed in on the satellite band. (The Ku band birds are in the same location over the equator as are the C-band birds.) What was required was unhooking several bolts, then watching the signal analyzer as the dish was adjusted up and down until the signal was absolutely peaked. This had to be done for several tracking locations to be sure it was truly locked in.

Finally, we all went inside—the result? A perfect Ku band picture!

#### SHOULD YOU DO IT?

There are several conclusions that we can draw from the efforts made by Chaparral toward converting our system to Ku band. First off, it works. It works, great!

Secondly, and very important for do-it-yourselfers, It's both harder and easier to do that we anticipated. There were unexpected compatibility problems. These were easily solved by obtaining the correct equipment. However, if you're going to have to go out and buy extra new equipment to make the conversion, you might want to consider the cost up front. If you're going to convert, check the compatibility first!

Perhaps more important were the installation problems. Getting the feedhorns precisely positioned was critical to making the system work. Additionally, adjusting the dish so that it tracked correctly also made for some tricky moments. Unless you're first rate as a do-it-yourselfer and competent to handle this precise work correctly, we suggest you don't attempt it.

While C-band can be owner-installed fairly easily, we suspect that expert installation may not only be a nicety, but may also be a necessity with Ku band.

Finally, for our system we used an entirely new receiver—the excellent Chaparral Sierra. However, for economy purposes you may want to first see if you can convert your existing C-band receiver to Ku. If you can, it could save some on costs.

Ultimately, we were very pleased with the Ku band reception we received. The receiver, the feedhorn and the dish worked admirably. In the process we hope that we put to rest at least a few of the concerns many have had with the problems of converting to Ku. ▀



# Interfacing The

**N**early all owners of home satellite earth stations also have an outside VHF/UFH antenna for viewing of the local networks. More viewing options is part of what satellite TV is all about, and the local antenna can give the kids a way to watch their cartoons while dad catches a ball game that can only be seen on the satellite dish.

Hooking in the local antenna and satellite dish to the various TVs in the house is an art in itself and can be done in several ways. How you interface your satellite receiver and local antenna can make all the difference in whether you have an average installation or a state-of-the-art home video entertainment system. By taking a few extra steps, you can add another dimension in convenience and ease of operation and gain some nice additional viewing and recording options.

Many of the newer satellite receivers have a place on the back for the local antenna, so that when the receiver is turned off, the TV is automatically switched to the local antenna. This works fine in a home with one TV, but that is seldom the case. Most American homes average two TVs or more.

Another common way to switch back and forth from satellite to local stations is with the use of an A-B switch. These are usually mounted on the side or rear of the TV set. A slide switch changes you from position "A," which might be satellite, to "B," the local antenna. With this configuration, both the satellite and local antenna cables must be split and one from each source sent to every TV in the house. In other words, you have two cables going to each TV, which means extra work and extra cable.

These A-B switches can have their disadvantages. For one thing, you are taking your state-of-the-art satellite picture and sending it through a part worth \$3-\$5. The slide switch works by friction and can often wear out rather quickly, degrading the picture. Since they are mounted on the side or behind the TV, each time the viewer wants to change from one antenna to another, he must get up out of his chair—an inconvenience not befitting the fully remote space-age videophile.

Ideally, you should be able to have your satellite channel appear as just one of the channels available on your TV at all times, in any room in the house. The trick is to combine the satellite signal with the local antenna, without the local stations overlapping and causing interference on the satellite channel, or vice-versa.

Your satellite receiver will nearly always come with an internal modulator which takes the satellite video and audio and puts it out on TV channel 3 or 4. Usually in most locations, at least one of these (channel 3 or 4) will be unused or open. If you try to watch your satellite channel (or VCR for that matter) on a TV channel that has a strong local station using the same channel frequency, ghosts of the local station will appear superimposed over your satellite video. That's why it is best, if you have a local station on channel

## *How You Can Combine Satellite Channels With Local Stations*



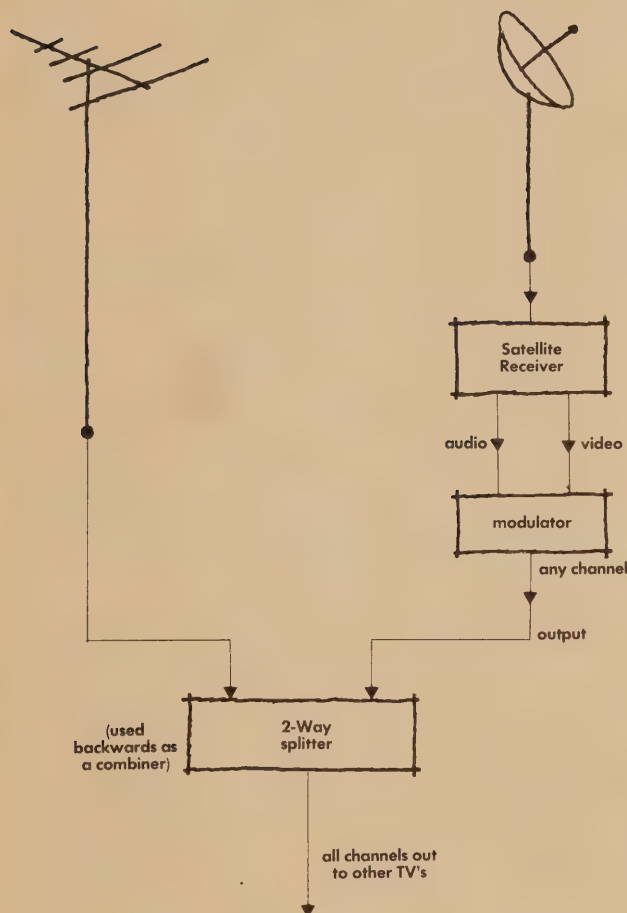
**Combiner** - Mixes satellite with local TV.

4, you can switch your satellite receiver to play on channel 3.

By using a simple device called a signal combiner, the signal from your satellite receiver can be mixed with signals coming down your local antenna coax with all channels appearing on the cable from the combiner output. The combiner is a filtering network that prohibits one channel from interfering with another. Commercial combiners have 8 to 16 inputs, resulting in all 16 channels appearing on the output cable. Combiners made for home use can be much less expensive, since we are only needing to insert one channel (our satellite) into a group of channels (our local antenna) which are already found multiplexed together on one cable. Available now is a small single-channel combiner especially made to keep satellite channel 3 from interfering with local stations 2 and 4. Or, a unit can be purchased to perform the same function, protecting local channels 2, 3 and 5 from satellite channel 4. Once installed, the combiners can be fine-tuned to clear any interference present with a small screwdriver inserted in the two adjustment ports in the upper left-hand corner. This interference will appear as the images of one channel superimposed on top of the other, or as a herringbone pattern across the entire screen, or as a



# LOCAL Antenna



*Simple splitter system.*

hum or a buzz in the audio on one station. While watching and listening to the TV, turn the adjustment ports for the optimum picture and sound quality.

In certain locations, your local stations can be extremely powerful and no amount of adjustment will clear the interference from the satellite picture. When this happens, it will be necessary to reduce the power of the incoming local stations with the insertions of an in-line signal attenuator. These come rated for different amounts of signal reduction, 3dB being the smallest, and 20dB the highest. Experiment with different amounts of attenuation until an optimum level is found. What you want is to reduce the signal to eliminate any cross-channel interference (called splatter) while still maintaining a sharp, clear picture. Too much attenuation will cause the picture to become weak and grainy. In many cities, often the best reception can be achieved by having one local antenna for each station, each antenna pointed for the optimum picture quality. Again, we will need to combine all the antenna signals together. Then each station can be regulated for strength individually. Strong ones may need attenuation while weaker ones may even need some amplification. Shop at your local radio electron-

ic shop for the materials professionals use. The people there should be able to advise you on the best system for your area.

One of the best ways to combine your local stations and a satellite channel is with the use of an external modulator. When combining TV channels, each station must stay on its dedicated space and not interfere with the other stations. That is why there are generally several unused channels between the active stations in each major city. The safest, easiest way to mix channels is to have an open or blank space between each active channel. For example, suppose your local stations were broadcast on channels 2, 4, 6 and 8. You could then place the satellite on any channel between 10 and 13 and have adequate separation. The satellite channel on 10 would not overlap onto channel 8, the nearest local station. Modulators can be purchased to operate on any channel on your TV. Usually it is best to stick with one of the VHF channels between 2 and 13. UHF channels, because of their high frequency, experience too much loss to be distributed through a cable network and maintain a quality picture. Even channel 13 needs more power to be distributed clearly than does channel 2. Since most satellite receivers do have a modulator for channels 3 and 4 built right in, most external modulators are built with a commercial application in mind. They will be more powerful than the one in the receiver, but that will be OK, particularly if there are several TVs or rooms in the house to be hooked in. There are several low-power models available that will be fine for the home distribution system, without being too expensive.

On the back of your satellite receiver are various output jacks usually made for F or RCA connectors (the kind used on home stereos). You want the jacks marked "Video" and "Audio Out." Two cables will go from the satellite receiver to the modulator at the connections marked appropriately "Video" and "Audio In." The modulator will have another jack labelled "RF out." This jack usually takes a standard "F" or coax connector. It is from here that your satellite TV signal is now on the TV channel you have selected.

Combining the local stations and satellite channel at this point is quite simple. You should have a coax cable coming from your local antenna and one from your satellite modulators. Take a regular two-way splitter and use it backwards as a combiner, rather than as a splitter. Connect the coax from the local antenna and satellite channel to the two output ports on the splitter. The splitter input is now an output with the satellite and local stations on one coax. This output cable is then connected to your home distribution system to send the signals throughout the house. A two-way splitter can only be used if the selected channel for your satellite modulator has at least two blank channels between it and the nearest active station. Otherwise, you will need a combiner with filtering.

Again, we must keep in mind maintaining a balance of



## Interfacing

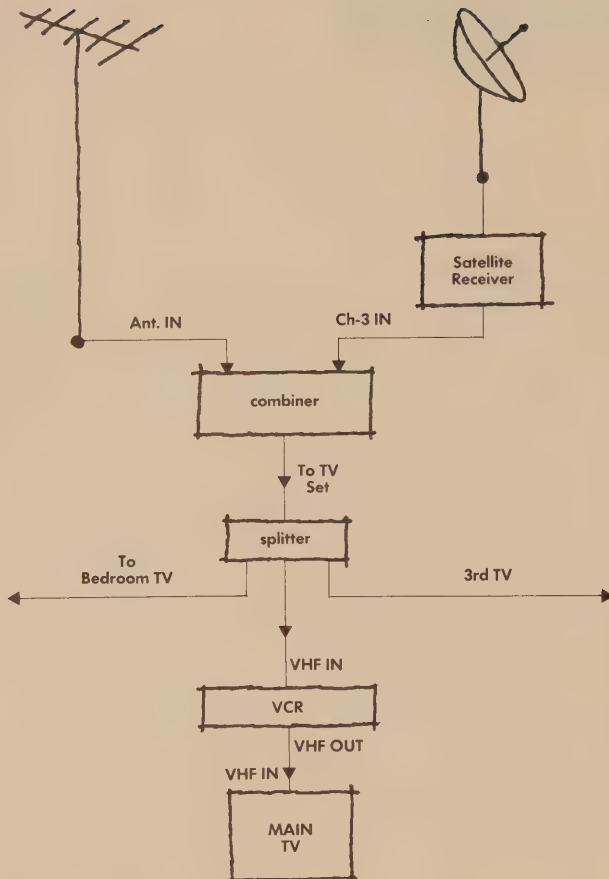
power. If necessary, the satellite modulator output may need to be reduced. Most modulators have an output power adjustment, and an in-line attenuator can be used to further reduce the power. After combining, you may want to boost all the channels back up again this time evenly, with a broad band amplifier. Since the highband channels (7-13) often need more power than the low band (2-6), many broadband amplifiers have separate output adjustments for each, so you can achieve an optimum balance. You may find your best mix by amplifying the local channels first, and then combining with your satellite modulator. Don't be afraid to try out different combinations. You want the best pictures possible on all of your channels, and unless you are a professional, a little experimentation will be in order.

Perhaps you have seen advertised, a little device called the TV Genie. It is basically a UHF modulator which takes the video from your satellite receiver and converts it to a UHF channel. But instead of sending the signal out on cable, the TV Genie sends out the satellite video and audio out through the air, by-passing all cabling. This sounds like a great idea, but apparently the FCC was afraid it might be too much of a good thing. For whenever you transmit a signal into the air, you run the risk of creating interference for someone else. All transmissions are strictly regulated by the FCC; hence, now the TV Genie has been made illegal. You will still see it advertised in many places as distributors try to unload their remaining stock.

A variation that uses the UHF channels but still uses distribution cable is manufactured by Rhodes Electronics. They take the various inputs and convert them to UHF channels 30-35. An amplifier inside the converter takes care of any extra power needed for distribution around the house.

Still another way to distribute your satellite and local antenna is with the use of a video switcher. This is a video accessory that accepts inputs from several different sources and will send each signal to any one of several different outputs. In the one I have illustrated, we have marked each output to identify the different locations in the house it represents, such as the bedroom, living room, etc. The inputs could be the satellite TV, the regular antenna, the VCR, even a computer or video game. One cable goes from the switcher to each TV set. All selection as to what is being sent to each TV must be done at the switcher. Each TV could have a different selection, or all could have the same. The VCR could be recording from the local antenna, while someone watches satellite in the bedroom, and you work on computer at the main TV.

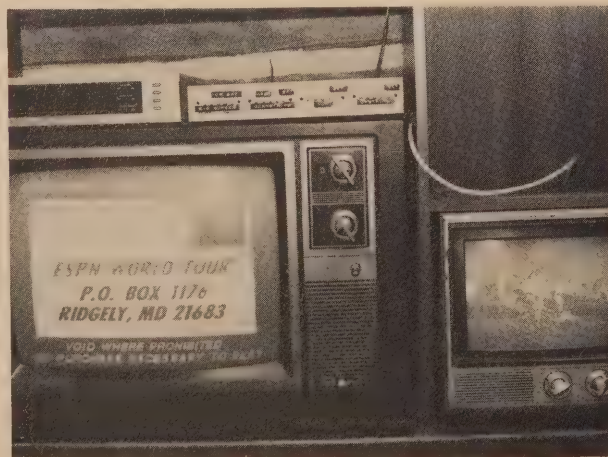
Whichever method you use, you will certainly appreciate the added convenience and versatility that combining your satellite channel and local stations gives. Follow the distribution charts I have illustrated and you should have no trouble putting the finishing touches on your home distribution network. Consult with your local satellite dealer if you need help locating a combiner or external modulator. Channel Master is one company that manufacturers combiners, attenuators, antennas and modulators and their equipment can be found at most electronic supply houses. By taking a little extra time now, you will save yourself the hassel of getting up to flip the A-B switch when you've gotten all settled in the easy chair after a hard day's work. You can have it all at your fingertips when you take the time to do it right. ▀



*Typical combiner system*



**Video Switcher** - Allows complete control when mixing signals.



**Dual Feed** - One TV watches satellite while the other sees local.



**AND NOW . .**  
**A word from**  
**our sponsor;**



## **'The TIV-ROW FUN PACK!'**

**YOUR INTEREST IN TVRO** (pronounced 'TIV-ROW' by insiders!) is evidenced by your reading this publication. If you feel your life will not be totally fulfilled until you have uncovered all of the 'trade secrets' of this fascinating flight into the future, stand by for a revelation of the 'true inside grit' from the master of TIV-ROW; **Bob Cooper, Jr.**



**HERE IT IS.** A package of materials, discounted to save you bucks, which reveals the trade secrets of the equipment, technology and the volatile 'personalities' of TVRO. You receive Coop's **FIVE YEAR HISTORY OF TVRO**, an exciting and exhaustive 180 page reference work placing all of the events of TVRO into proper perspective. You receive the 150 page **HIDDEN SIGNALS ON SATELLITE**, co-authored by Coop and Tom Harrington. **AND**, you receive a copy of **COOP'S SATELLITE DIGEST**, the REAL 'insider-TVRO-trade-publication' that unlocks the mysteries of **wholesale pricing** and system design. The retail value is greater than \$30.

**BUT WE SAVE YOU DOLLARS.** For just \$25 including UPS/Parcel Post shipping charges, West Indies Video will ship you your 'TIV-ROW FUN PACK' immediately! You may order by mail (enclose full payment, **in US funds**) or you may order by telephone and use your VISA/MASTERCHARGE card. Full instructions are below.

**I WANT the TIV-ROW FUN PACK!** Enclosed my payment in US funds for \$25; please ship immediately.

NAME \_\_\_\_\_

Company (if applies) \_\_\_\_\_

Address \_\_\_\_\_

Town \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

\_\_\_\_\_ Charge my VISA \_\_\_\_\_ Charge my Mastercharge card

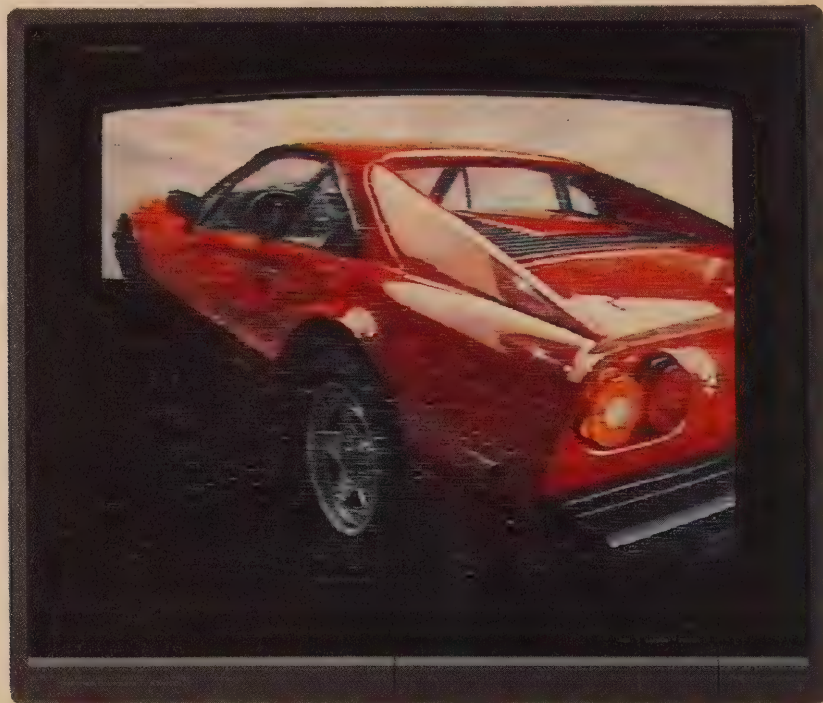
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**Instructions:** Complete, make out check to West Indies Video and mail to P.O. Box 100858, Ft. Lauderdale, Fl. 33310 **OR** telephone 305/771-0505 for Visa/Mastercharge orders weekdays 9AM to 5PM eastern time.

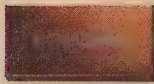




# It's About Time Someone Clear



*As this actual screen to screen comparison shows, Starcast's™ exclusive PicturePlus™*

 There are some things that just don't belong on television today.

"Sparklies," for example.

You know, those disgusting little electronic glitches that are forever turning otherwise decent television programs into something unwatchable.

Well we're not going to take it anymore.

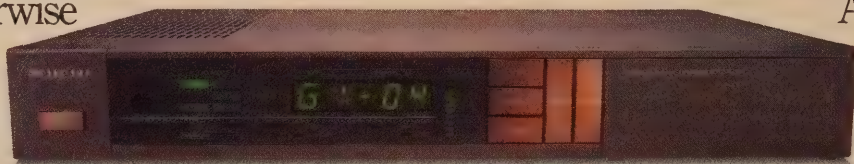
Introducing the Starcast System™ and its exclusive PicturePlus™ circuitry.

Just push the PicturePlus button and "sparklies" virtually disappear.

Giving you the clearest picture in satellite television.

The Starcast receiver also comes with a built in antenna positioner, full-function remote control, parental lock, digitally synthesized audio, and more.

And there's even a feature called "Snapshot Memory"



*The Starcast receiver has it all, including built in antenna positioner, "Snapshot Memory," remote control, stereo, true C/K Band compatibility and more. And it's ready to accept any of the major descrambling units now available.*

that remembers satellite location, video fine tuning and audio mode.

As you'd expect, the Starcast receiver is truly C/K band compatible and ready to accept any descrambler on the market.

Of course, there's no way we'd let



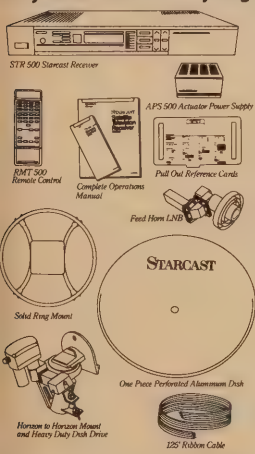
# ned Up The Filth On Television.



us" circuitry can turn a dirty picture into one the whole family can watch.

a receiver this good be matched with anything less than a perfectly matched system. So to make sure you get perfect pictures all the time, Starcast is sold as a complete system. With every-

## Our System Comes With Everything.



thing from our one-piece 8-foot perforated aluminum dish right down to the 125 feet of UL-approved ribbon cable designed to improve your picture.

And it all comes from the same place. So, in the unlikely event something goes wrong,

there's just one place to call.

We could go on about how Starcast will clean up your T.V. picture, but to believe it, you've really got to see it.

So to find out the closest Starcast dealer to you, give us a toll-free call at Cincinnati

Microwave Communications, (800) 245-3435.



The Starcast 8 ft. one piece aluminum dish is formed on a precision steel mandrel.

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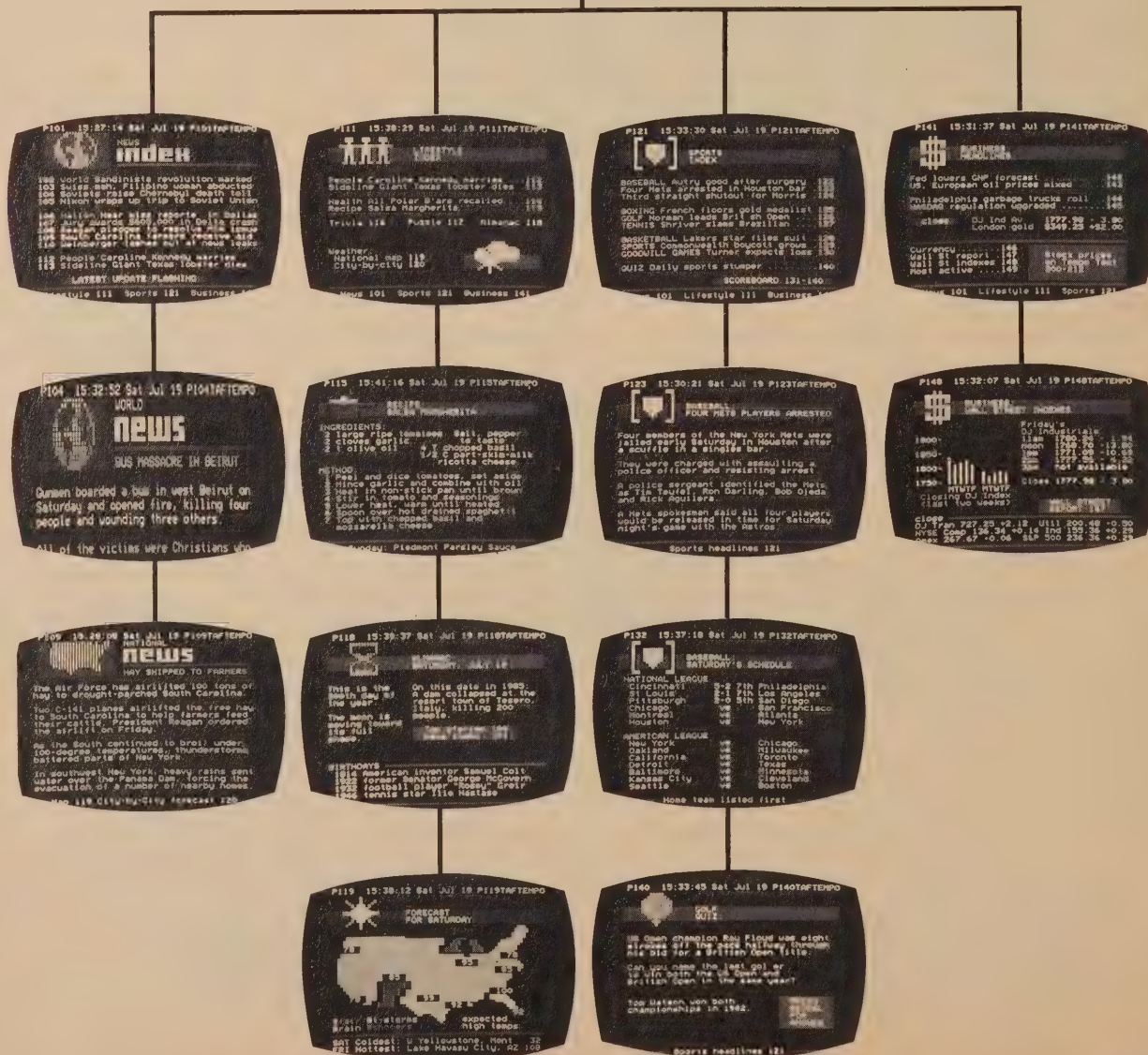
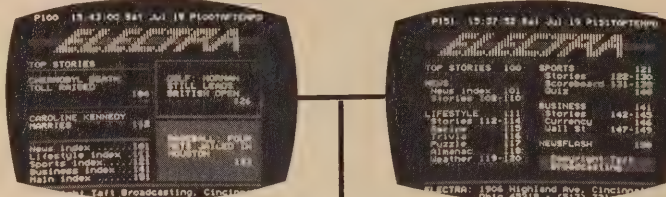
*The Clear Choice In Satellite Television.*



Just give us a call toll-free 800-245-3435



**The Structure Of News** - *Electra Teletext works on a menu. Top screens indicate menus of what's available. By making different selections reader can work down to actual stories. For example, top left menu lists headings such as "News Index," "Lifestyle Index," and "Sports Index." Selecting "News Index" takes viewer to News Menu (second level, far left). There viewer can select from 11 different stories. Last two levels, far left, are the actual stories. Middle left column ends up at weather map. Middle right goes to sports schedules and quizzes, far right gives business headlines and Wall Street indexes.*





# papers Are Here!

## *Your Dish Can Deliver The Latest News Through Teletext*

BY TIM HARRINGTON

**W**hat is your source for news when you want it as current as possible? News from newspapers is anywhere from 4 to 24 hours or more behind the times. With TV and radio news you have to tune in at a certain time and then hope that they cover the news that you are looking for. Even CNN, which runs around the clock, may not give you the details on sports scores or other specific events that you want to know about. You'd think with modern satellite communications and computers that there would be a better way to deliver *specific* news stories or categories of stories to you when *you* want them. There are many more advantages to owning a home satellite reception system than just dozens of channels of high quality video and sound and, if you're not familiar with teletext, you are about to discover another advantage.

### WHAT IS TELETEXT?

The concept of teletext can be summed up by describing it as an electronic newspaper with some truly fantastic features. These benefits place it in the category of a communications medium that is revolutionary. In order to fully appreciate the benefits of teletext delivered news, it is important to understand it conceptually. If you are unfamiliar with teletext, then you will find it different from any other way you have ever received news. There is a term you should become familiar with that is often confused with teletext. *Videotex* refers to any kind of text or graphics which can be displayed on a TV screen or monitor. *Video-text* is a two way service delivered by cable or telephone lines. Teletext, which is what we are talking about, is simply a type of *Videotex* and is a one way transmission only.

When you think about teletext, you might wonder if you would really want to read an electronic newspaper. It is often assumed that teletext news simply scrolls by on the screen with no control by the reader. Just the opposite is true. It is the very way that teletext data is structured and presented that makes it so easy and enjoyable to use. With teletext, news is up-to-the-minute and available on demand. You can select a news category such as sports or business and then go directly to a specific story in a matter of seconds. In fact, once you use a teletext system for news you may find that you prefer it over other news mediums. It is especially handy when you want to find out about a current fast-breaking story soon after it happens. Think about the alternatives: waiting for the news to appear on the TV or radio or picking up an out-dated newspaper.

The technical details of teletext will be covered in Part II in this two-part series of articles on teletext. However, a brief description of how it works will be helpful now.

Teletext information is actually in the form of computer data and is transmitted along with a standard TV picture. It is carried in the VBI (vertical blanking interval) which is

the normally black band that you can see when your TV picture rolls. You can check for the presence of a teletext data stream on a particular channel by slowly and slightly turning the vertical control knob of your TV set until the picture moves up or down far enough to see the VBI. If it contains many small blinking dots then a teletext data stream is being transmitted along with the picture. A solid black band means no data is present. The teletext decoder pulls the structured series of dots from the VBI and then converts them to text and graphics. The decoder is really a converter because the services are not encoded or scrambled, they are just in a form that requires conversion to a format your TV set or monitor can display.

Teletext can ride along with any TV picture either on regular local broadcast TV, via satellite or on a cable system. So if there is a teletext service on one of your TV channels, then it is likely that you will be able to receive it by using a decoder. Hookup is a simple two cable connection to your TV set if it has direct video and audio inputs and if not, then you can feed it through your VCR (video cassette recorder) which has direct video and audio inputs.

### TELETEXT SERVICES AVAILABLE

Although many services have started and failed, there are a few that offer the most in-depth overall general news coverage. There are currently three services that are operating, all on Galaxy I satellite. Electra and Tempo-Text are on transponder 18 and Infotext is on transponder 22.

Electra is a joint venture between Zenith and Taft Broadcasting, Inc. and although it is considered experimental at this time, I have found it to be a very good quality service. Zenith is planning to build teletext converter circuitry into their TV sets sometime in the future, which means that a consumer would be able to automatically receive teletext services that are present in the picture. Electra and other services are set up like an electronic newspaper and, just like a newspaper, offers a wide variety of stories, information, news, weather, sports scores, business data, human interest stories and much more. There is even a puzzle and a trivia question.

Tempo Text offers more in-depth business data on stock and commodities markets. Infotext is a University of Wisconsin/Agri-Sat publication that provides, among other things, commodities, prices, detailed weather information and futures data that is farm oriented.

Teletext is common in Great Britain and is sure to catch on in the United States. Future services will probably expand to include airline schedules, local traffic and weather conditions and other national and local happenings. The general consensus is that more services will appear in the future and that they will probably be adver-





The Vertical Blanking Interval can be seen by rolling your TV picture up or down using the Vertical Control Knob.

## Electronic Newspapers

tiser supported and free to anyone who wants to receive them. So for the foreseeable future, the only cost involved with Teletext is that of the decoder box.

### USING A TELETEXT SYSTEM

Most teletext systems operate in pretty much the same way and for purposes of discussion I will refer to the Electra service and the VBI-I decoder. A teletext news service is set up as a series of electronic pages, with each page representing a screen full of text and/or graphics. Each page has a number so you can select and go directly to a page, without having to pass through any intermediate pages, by simply keying in the page number desired. This is similar to a newspaper or a magazine in that you can go directly to the page you want after looking at the table of contents.

Just as with the newspaper that you regularly read, when you become familiar with a teletext service you will probably remember the sections to which you would directly like to go. Teletext goes one step beyond a newspaper in the way that it is indexed or structured. There is a screen that comes up automatically when the system is first turned on which is usually page number 100. This screen is the equivalent of the front page of a newspaper in that it has the headlines, each tagged with a specific page number which contains the complete story. Under the headline is a list of pages containing section index information such as the sports or business index. This master index is an index for the indexes. Once you turn to a section index, such as sports, it will have headline detail for each page in the sports sections such as headlines and where to find the latest sports scores. Remember, once you become familiar with a service, you will in most cases be able to skip the indexes and go straight to the sections that you like. Sports buffs will really appreciate the fact that the scores are kept up-to-date and you'll see sports scores change while you are watching the screen. It is also interesting to watch the front page headlines change and fast-breaking stories appear.

There are some really great features incorporated in the teletext system. For example, the text can be placed either on a blank screen or superimposed over another show that you are watching. The Electra system offers a newsflash mode that allows you to watch a regular program while the decoder is still operating. When a big story breaks, the decoder alerts you with a line of text that tells you the screen page on which to find the story.

Another nice feature is the half screen mode. There are two keys on the remote control-labeled top and bottom. Pushing one or the other selects either the top or bottom

half of the screen of information and enlarges it to full screen size, effectively doubling the size of the text. This makes it readable from across a room on a 19 inch TV set and readable at normal viewing distance on sets of 5 inches or smaller.

There is even a regular puzzle included in the service which demonstrates another neat feature of the service. The answer is hidden on the screen and can be revealed by a key on the remote control called the "reveal key." This feature is also used on the sports trivia question screen where the answer is also hidden.

### WHERE CAN I GET ONE?

Now that you know more about teletext, you may be wondering where you can buy a decoder and how much they cost. Since not many people are aware of teletext decoders, they are not widely available in stores. I can recommend two reliable mail order sources for them: Dick Smith Electronics Inc., which offers a decoder in kit form and Delta Satellite which offers a ready-to-use unit. Ordering information is provided at the end of this article. The Dick Smith Electronics model is offered in kit form for \$199 and is relatively easy to assemble if you've had some experience in assembling electronics kits of the Heathkit or Radio Shack variety. You can have it up and running in two or three evenings depending on your skills. An infrared remote control is offered for this model for an additional \$34.95. The Delta Satellite model comes completely assembled for \$399.

In Part II of this series I'll get into the technical side of teletext and how to receive it. We'll take a look at an overview of the history of teletext. Included will be drawings of how to connect a teletext decoder to your system.

### SOME SOURCES FOR TELETEXT DECODERS

Please note that prices and information are current as of press time. Please call supplier for current prices and details before ordering.

#### ASSEMBLED -

**Video Business Ind.**  
2108-C Bering Drive  
San Jose, CA 95131  
National - 408-436-2946

**Delta Satellite**  
One Echo Plaza  
Cedarburg, WI 53012  
National - 800-558-5582  
Wisconsin - 800-242-2290

#### KIT FORM - Dick Smith Electronics

\$199.00 each for complete kit and \$34.95 for a companion infrared remote control.

**Dick Smith Electronics Inc.**  
DS Xpress Order Center  
P.O. Box 8021  
Redwood City, CA 94063  
415-368-8844

*Special thanks to: Dick Smith Electronics and Delta Satellite for their contributions to this article.*

*This article is an excerpt from a book on home entertainment systems by Tim Harrington to be published in the future. ♣*



# Photos From Space

## *The FAX Transmission Method And Your Satellite Dish*



**Quick News Photos -** M-800 Fax Converter Driving an Epson FX-85 dot matrix printer displaying wire photo on shortwave bands.

BY TIM HARRINGTON

One of my favorite topics of discussion when the subject of home satellite TV comes up is the fact that it is not just TV but much, much more. When you imagine all of the other forms of communications that can potentially be received with a home satellite reception system I think we should call it a home satellite communications system. You can receive communications such as teletext (electronic newspapers—see article in this issue on teletext), computer date, radio stations and Fax (facsimile—the trans-

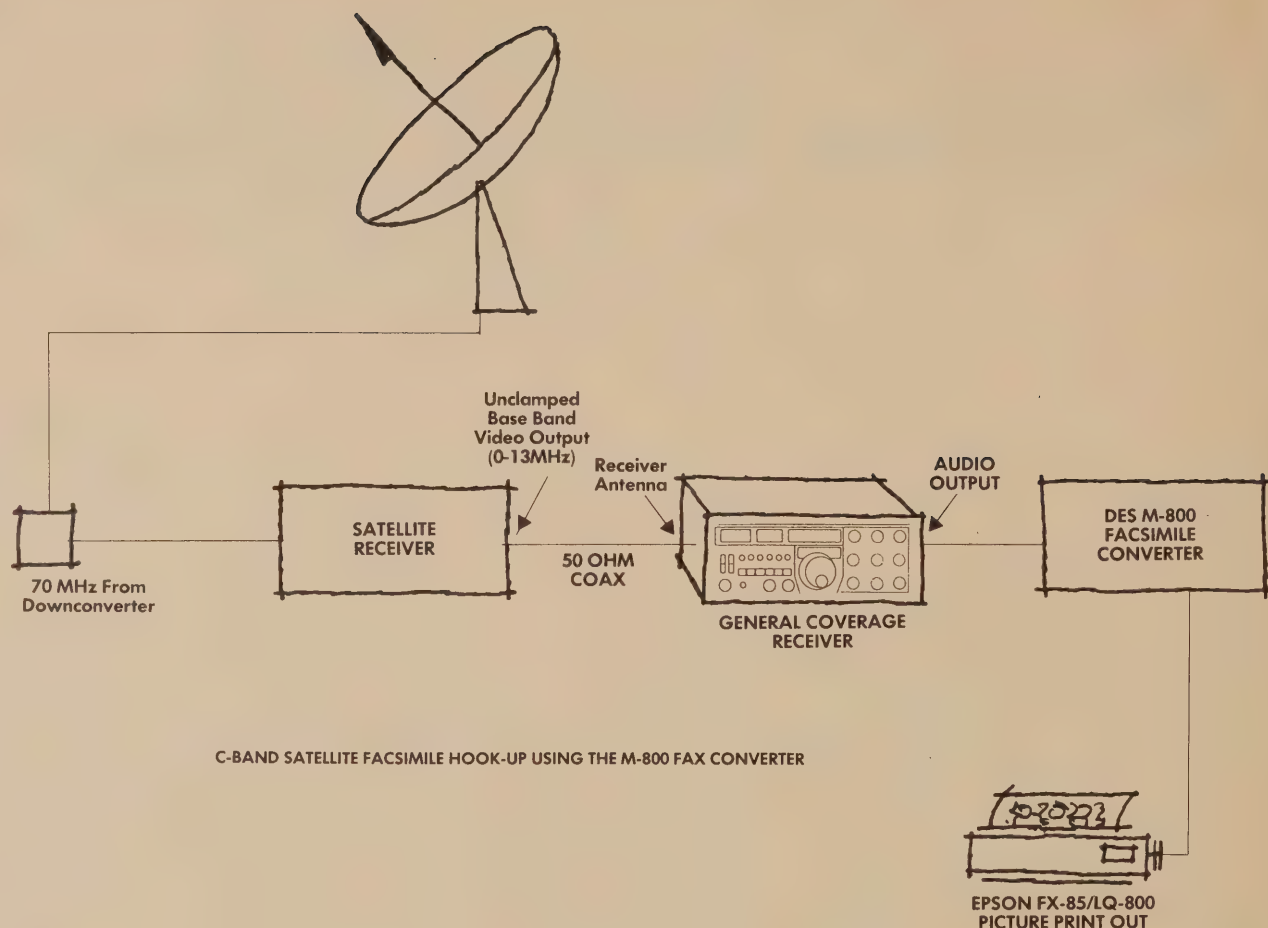
mission and reception of hard copy photographs and other graphics such as weather maps) to name a few. All of the above transmissions which used to be sent by wire and radio can, in most cases, be handled better and usually less expensively by satellite. The reality is that satellite communications will ultimately have the same degree of impact on society that the telephone did as it was developed and phased into society. Although satellite communications seems like, and is, an advanced technological marvel, it is still in its

infancy. This month we'll take a look at FAX (facsimile) which is a transmission method that allows man to beam high quality photographs and images all over the globe. You'll also be introduced to an inexpensive method of receiving high quality hard copy images via satellite or short wave radio.

### WHAT IS FAX?

Have you ever wondered how a news photograph taken at 9 a.m. in the morning can be on the front page of newspapers all over the world a few





C-BAND SATELLITE FACSIMILE HOOK-UP USING THE M-800 FAX CONVERTER

## Photos

hours later? The answer, of course, is electronically. If you look in the corner of photographs seen in the newspaper, many of them will have "Associated Press" printed in small letters. This designates that the picture was transmitted by the AP network that was set up to distribute images electronically. The designation used to be "AP wire-photo" when photographs and other images were distributed by phone line. Now they are distributed by satellite. UPI and AP are networks set up to acquire and distribute news and photographs. As images are collected at key offices around the country they are converted to electronic form for transmission and uplinked (transmitted) to a satellite. Any newspaper or magazine that has the proper equipment can receive quality photographs for publication from UPI (United Press International) and AP. The transmission is not encoded or scrambled but is copyrighted which means publications must pay a fee for the service and the use of network provided images in their publication

Imagine being able to receive news photos from fast-breaking international events up to a day before they appear in newspapers. Or seeing pictures that your newspaper chooses not to print either because they don't have room or would not be well received in your area. The commercial equipment required to decode and print photographs is expensive. It costs \$15,000 or more which is well out of the reach of an average consumer. But now there is a new unit available that will process and print satellite transmitted photographs and weather maps for under \$1000! This advanced new FAX processor offered by Universal Electronics is consumer oriented, user-friendly and a fraction of the cost of commercial models. One of the secrets of its low purchase price and operation is that it uses a standard dot matrix printer commonly used with personal computers.

### HOW DOES FAX WORK?

If you have ever used a business FAX machine then you are already familiar with FAX. The concept of

how FAX works is relatively simple. The sender places the original of the item to be sent in a FAX transmitting machine. The FAX machine scans the original in hundreds of horizontal passes with a sensor that measures the relative lightness and darkness as it passes over it. Circuitry in the machine converts this information to an electronic signal that is then transmitted to the receiving machine. The medium of transmission can be any number of ways such as satellite, telephone line or radio. Expensive commercial FAX processors take the transmitted signal and convert it back into levels of lightness or darkness with either a very fine light that scans a piece of photographic paper and exposes it or with a thermal method that heats a point on a special paper causing it to darken. The M-800 uses a far less expensive dot matrix printer to print various levels of grey in direct correspondence to what the sensor saw at the transmitting end.

A dot matrix printer produces text and graphics by firing a series of pins against a printer ribbon. Whenever a pin strikes the paper it leaves a small



black dot. These dots are arranged in patterns to form letters and images on the paper. Various levels of apparent grey ranging from white to black are created by how close together the dots are printed. It is these varying levels of perceived grey that form an image. Even though the dots are black, the closer they are together the darker the pattern appears to you. This is how newspapers and in fact this magazine are able to produce and print black and white photographs using only solid black ink. If you look at a black and white photograph in this magazine using a magnifying glass you will notice that it is made up of small dots.

#### THE DES M-800

One significant difference between the M-800 and a commercial unit is that it does not require the special expensive paper used by the commercial units. Commercial units print directly onto special paper which is needed for reproduction in newspapers. The M-800 prints on regular printer paper right out of a dot matrix printer such as the inexpensive Epson FX-85 commonly used with home computers. The printer is one less thing you'll have to buy if you already have one for a personal computer. You can connect your printer to a standard A/B switch that will allow you to switch the use of the printer back and forth between the FAX machine and your personal computer.

A general coverage radio receiver is required as a link in the chain between your satellite system and your final printout. You *do not* need a license to receive radio transmissions with a

short wave rig (only to transmit). Once you get a short wave system you may develop a desire to get a license and go on the air, but that's another story. In order to receive and process FAX transmissions, it is important that you have a proper general coverage receiver. Some models known to be of good quality are Japan Radio Company's NRD-525, Kenwood R-1000 or R-2000 and the ICOM R-71A. Many so-called shortwave receivers sold in discount stores and other retail outlets will not perform well for this application. If you decide to purchase a short wave radio, it would be wise to visit a reliable amateur radio store or electronics store that stocks name brands such as JRC, Kenwood and ICOM.

#### SET UP AND OPERATION

Set up and operation of the M-800 is simple and straight forward. A 50 OHM coax cable is connected between the unclamped video output of your satellite receiver to the antenna input of a general coverage receiver. The output of the satellite receiver will probably have an RCA jack so you would use an adaptor that would connect it to a PL-259 connector for this end of the coax cable. The audio output of the shortwave receiver is then connected to the DES M-800. The M-800 connects to the printer with a standard RS-232 printer cable.

#### WHERE TO FIND FACSIMILE TRANSMISSIONS

As stated, facsimile can be received both by satellite and short wave. There are hundreds of facsimile signals available and are listed in several

available facsimile publications. A list of facsimile publications can be found at the end of this article. There are also frequency lists published by the government, Navy and national weather service. The government lists can be obtained from the government printing office for a nominal fee.

The DES M-800 is the first of its kind to offer an inexpensive, easy to use FAX unit. It will produce unequaled high resolution hard copy printouts of all of the press, wire service photos and weather maps from around the world. It will also handle all marine meteorological FAX transmissions transmitted by the Navy and government agencies. All that is needed is the input of a high quality signal to the FAX system and you will be off on a new adventure of satellite and short-wave communications.

In future articles I'll discuss other applications for satellite communications technology such as VSATs (Very Small Aperture Terminals), teleconferencing and other exciting non TV forms of satellite communications.

To order a DES M-800 or for further information, contact: Universal Electronics, 4555 Groves Road, Suite 13, Columbus, Ohio 43232. 614-866-4605.

*Special thanks to Tom Harrington for his support on this article. ♣*

#### SOURCES OF FACSIMILE ITEMS

##### DES M-800 FACSIMILE CONVERTER

Universal Shortwave Radio  
1280 Aida Drive  
Reynoldsburg, Ohio 43068  
Plus other leading SW dealers

#### BOOKS

##### FACSIMILE PRODUCTS GUIDE

U.S. Naval Eastern Oceanography Center  
Norfolk, VA

##### FACSIMILE GUIDE BY KLINGENFUSS

Universal Shortwave Radio (address above)  
CRB Research, P.O. Box 56 Commack, NY 11725  
E.E.B. 516 Mill St. N.E., Vienna, VA 22180  
EGE, Inc. 13646 Jefferson Davis Hwy, Woodbridge, VA 22191

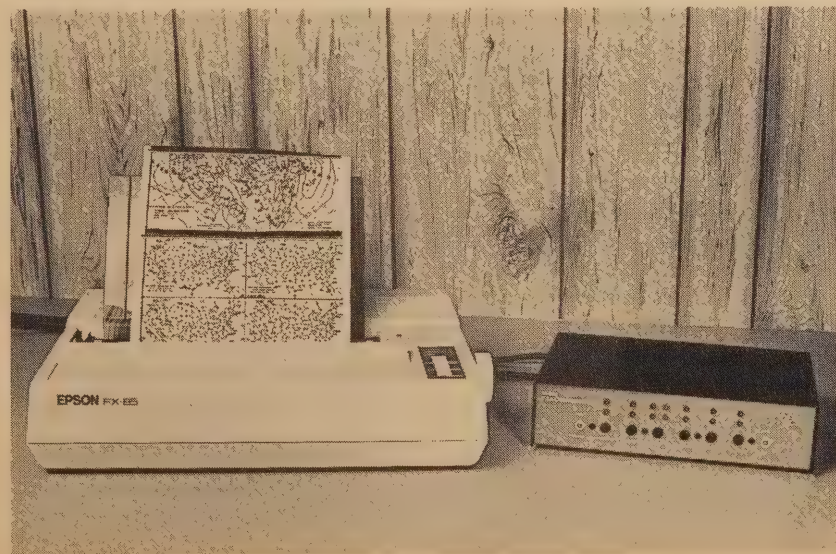
#### OTHER WEATHER INFORMATION

##### (Worldwide Marine Weather Broadcast)

National Weather Service Office  
Ocean Service Center  
1120 Old Spanish Trail  
Slidell, LA 70458  
504-522-7330

National Weather Service Office  
Room 302  
World Weather Building  
Washington, DC 20233

**Weather Charts** - Earth photos displayed in 16 shades of gray from national weather service and satellite services.





**"I'M FROM NRECA AND  
I'M HERE TO HELP . . .**

In the second round of Congressional hearings held back in June to dig into the difficulties facing the home TVRO viewer, there was a surprise lead-off witness from the National Rural Electric Cooperative (of) America. The NRECA is a trade association of sorts, representing the nation's rural electric co-ops. The co-ops may be more important in American life than you are aware; while they only serve as a group 11% of the American homes, those 11% of American homes are spread over 75% of the American landmass. That means there are more miles of rural electric co-op lines over America than the better known electric companies that serve the urban and city regions.

The NRECA wants to get involved in the satellite television business. They said so at the Congressman Wirth hearings. Their plan was greeted with great enthusiasm by members of Congress, and considerable concern by the cable interests present. Let's see why.

Since cable announced it would scramble many of the more desirable programming channels, there has been a concern that the programs would be priced too high to be considered affordable by the typical American rural dish owner. It is quite one thing to take out a loan for a \$2,000 dish and pay it off at say \$65 a month for three years. Most working families, rural families, can handle that. It is quite another thing to suddenly be forced to shell out another \$30 or \$40 a month to continue to enjoy the programming which was initially available at no program cost. The NRECA hoped to assist rural Americans in that fix by bringing out a \$10 "basic program package". They announced this during the Wirth hearings. Naturally, that made the NRECA look pretty good and several of the Congressmen present applauded their initiative.

After the announcement, reality set in. The NRECA decision to become a satellite program packager had apparently been made only days prior to the hearings. In the rush to get NRECA testimony into the record, several important things were overlooked. One major oversight was that the electric cooperatives neglected to talk with very many (if indeed any) of the cable programmers in advance. There was an element of shock on the face of several of the cable execs wait-

# A Satellite Just

ing to testify as the NRECA spokesman unraveled his plan. To those watching on television, it was apparent that most (if not all) of the Congressmen had been forewarned of the testimony. Immediately following the NRECA tale, there was near unanimous Congressional consent that the NRECA plan was *the answer*. What they meant was the ball was now back in cable's court. Here's why.

Cable has maintained since they began marketing to home TVRO early this year the following creed:

*Distribution of our (cable) satellite programs must be done by a company that is financially stable, well-established in the community, and can guarantee (us) large numbers of customers.*

I should point out that this description fits cable companies to a "T". It fits virtually nobody in the home TVRO business; even corporate giant Uniden, with more than 50% of the receiver hardware market in 1985 has gone through some very recent (and current) "unstable times". So it was with a certain amount of smugness that cable harped on this "condition" for any firm that might wish to become a part of the software distribution scheme.

Many other American business firms would fit that description of course. I have often pondered why Radio Shack did not raise their hand in this game. They, after all, have more retail outlets nationwide than cable has cable systems. But Radio Shack is not our object here; the NRECA and their rural co-ops are. Senator Gore from Tennessee, a state that knows a great deal about rural electric cooperatives, noted after reciting cable's condition for program selling affiliation:

*That same description also fits the rural electric cooperatives.*

Senator Gore hardly had to make that point; the cable execs on hand quickly recognized their hand had been called. The back peddling and

water thrashing began immediately.

In the weeks that followed the House June hearings, HBO and Showtime quickly *rejected the plan* and said "no thank you, we will not participate". That of course makes HBO and Showtime look like the introverts they really are; we can thank the NRECA for pushing the two movie giants into a corner where they finally had to admit they are selfish people who won't deal with anyone but those of their own race.

The NRECA can be faulted as well of course for being talked into appearing before a Congressional group without adequate advance study. They meant well, they said well, and they looked well. But in the final analysis their best-laid-plans will never fly unless there is intense Congressional pressure (in the form of a new law from Congress) *forcing the movie moguls* to deal with folks like the NRECA.

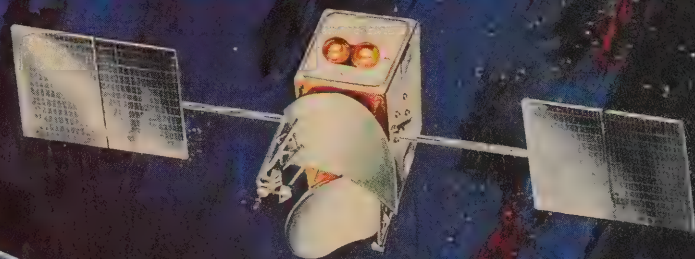
Well, I have a suggestion for the NRECA. I like their style even if their game plan was initially flawed. I also like the fact that Congress likes them, and that what Congress likes can often be shaped into something that the rest of us will like as well. Here's my plan for the NRECA.

First of all, if you can afford to build huge dams and gigantic rural country power lines, you certainly can afford one little old satellite. Of your own. You have 10,000,000 American homes using your service. If you added \$1 per month to each of those home's electric bills for 12 months you would have an extra \$120,000,000. I guarantee we can find you a nice, slightly used but still manufacturer-warranted 24 channel satellite to call your very own for \$120,000,000. Perhaps less.

I look upon the present cable monopoly just as my fore-fathers probably viewed the people who built the first toll roads over the Appalachian mountain chain. I figure my fore-fathers wanted to move west pretty bad and they probably didn't have the money to pay some guy who hacked



# For Dish Owners



## *A Very Workable Plan To Beat The Cable Monopoly*

out a trail over the mountains just to get there. If they had that kind of money, they would have stayed in New Jersey. Then somebody, probably Daniel Boone, figured out that the rivers went where he wanted to go and with a little more effort he could travel down a river and avoid the toll. Those cable people are the modern day equivalent of the toll road operators 200 years ago standing in the way of opening up the Ohio territory.

So the NRECA should buy their own satellite. That will get them down the river and into Ohio without paying a toll. Now the second problem; the cable people have built several dams across the river and they are not going to allow us to pass over or around those dams with a pleasant wave. The dams are the cable people's ownership of the programming.

Not to worry, NRECA. There are ways around those dams and I'll give you some no-charge advice on that problem, too.

First, how many channels should you put on your satellite? It would be

nice to go for the full 24 all at once but let's be smarter than that; we'll put up 15 or so to start and then every six months or so we'll add a couple more until the full 24 are filled up. That makes the rural consumers happy everytime you add a couple of channels because you won't charge them anymore for the new channels.

Now, which 24 channels? Or which 15 to start with?

We already know that people like movies and they like sports and they like news. Pretty much in that order if the 1985 and 1986 satellite surveys mean much. But, the cable people have the movie channels all tied up; right? Not quite. For recent movies, there is the Home Theater Network (F3R, TR16) which has somehow managed to stay on the air since 1978 inspite of low cable penetrations. It might even set well with rural Americans who are basically pretty fundamental people. Oh yes, with only a few hundred thousand cable homes paying for HTN these days, I think the prospect that they might grow to a 10,000,000 audi-

ence in a few years would get their attention. *And that's one channel.*

Then there is the Caribbean Satellite Service (TR16 on Westar 5). They show oldie-but-goodie movies 24 hours per day. They don't charge any money for the service because they hope to make it on advertising. *And that's two channels.*

*Sports* is a little tougher if you start shopping around for a sports-only service such as ESPN. But there is an answer and it comes from Canada. The Sports Channel on Canada's ANIK-D satellite is an ESPN clone. If they get real lucky in Canada, they may someday reach an audience of a couple of million. Their rates are low, like ESPN's. Offer to take them into the states and increase their audience potential by 500%. They'll like the offer. And that's the basic sports channel.

*News* is alot tougher if you must have 24 hour per day news like CNN or CNN Headline. Turner has made sure his service is unique and that means there are no cypcats or clones



# Dish Owners

out there. There are other answers to the news problem and if NRECA asks me I will tell of our "moves" for the price of a magazine!

**Music.** MTV is an easy target. Over on RCA's F4, TR18 is a music service (Hit Music USA) which concentrates on playing music. They have not yet gotten into mixing wrestling with music or foreign famine relief. They also avoid the somewhat controversial blood and gore videos that MTV seems to like. *And that is our fourth channel.*

Fifteen is just a stone's throw away.

**Religion.** Cable has a death grip on PTL and CBN. They have even made Doctor Pat Robertson write an 11th Commandment: *Thou shalt not step on your cable affiliates.* For those who may not be aware, Robertson's CBN has decided to scramble because he has been told that if he doesn't scramble, he will lose big chunks of his 30,000,000 home audience. Cable will drop him like yesterday's bad movie. OK, there are many more up there. I counted five in a recent evening, all 24 hours per day, all sounding like they would be perfectly acceptable to rural America. I hesitate to recommend just one over the rest so let's just accept that we have a choice in the religion department. *And that is our fifth channel.*

**Country.** If there is one thing that rural America is, it is "country". We are all familiar with The Nashville Network. That's country. But I think there is a better country service up there and it is called "CMTV" or Country Music Television. It is found on Telstar T3, transponder 1. They have very little cable acceptance (one wonders how they stay on the air at all) and the opportunity to be into 10,000,000 rural American homes should make their heart beat twice as fast. *And that's channel number six.*

**Public affairs.** This is "part" of our news answer. C—SPAN covers Congress full-time. C—SPAN will never scramble, and although the network has close cable ties, Congress would see to it that the channel was available to a rural satellite service. I guarantee that. *And that is channel number seven.*

**Networks.** There is no federal law to stop the NRECA from uplinking one each CBS, NBC, ABC and of course PBS station to satellite. The process is very uncomplicated; WGN,

WOR, WTBS, WPIX and KTVT get on satellite (as "Superstations") by someone following this process. I'd suggest we go to a real farm belt state such as Iowa or Nebraska or Minnesota and we select a set of network affiliates to uplink, turning the selected stations into "Rural Network Superstations". *And that is numbers 8, 9, 10 and 11.* We are within striking distance of our initial 15 stations.

**Independents.** Here is the chance to give Turner a real fit or two (hey, he "turned on" home TVRO in the end and a turn about is only fair play!). First, to do indies "right" you need to select one from each time zone. Rural people deserve on-time programming on at least one channel so you select one from the eastern, central, mountain and pacific time zones. Between those four indies, you'd have a big bunch of new movies, lots of sports, and enough off-network programs to choke a horse. The law here is the same as the law for network uplinking. Just do it. *And there we have numbers 12, 13, 14 and 15.* They sort of sneak up on you. All 15 are in place.

Once you get this far, the rest are easy. Creating a 24 channel satellite designed for rural America is infectious. Once you get started, it is difficult to stop. So I'll show you how I would tack on numbers 16 and 17.

For several years now the Canadian home satellite service company, CANCOM, has been "stealing" US network signals out of the Detroit market by catching one each ABC, CBS, NBC and PBS and putting them up on ANIK-D. Then CANCOM collects money from rural Canadian folks for this service. They make it work because they scramble these four signals. OK, if the Canadians can "steal" American signals and get away with it, a turn about is only fair; right! So I suggest we grab a near-border Canadian from Ontario and another from British Columbia and we make them our numbers 16 and 17. That gives us both coasts, a different perspective on the news (you have to watch Canadian news to believe how different it is than US news coverage) and there is one more interesting wrinkle; *pre-release.* The US networks often allow the Canadian networks to release the American shows a week or 10 days ahead of their release in the USA. They do this because US signals virtually saturate Canada and if the programs were released at the same time or after the US released them, the Canadians would find little value in watching last week's

"Dynasty". So being greedy networks, they would rather sell early to Canada than not to sell at all. That would give the farm folks a few days or a week head start on "Dynasty" and the other popular serials. That alone is a pretty good reason to include a couple of Canadians in our mix!

I have to really force myself to stop at 17 because I am just getting warmed up. If I was in charge of this project, I'd pass 24 without even trying.

**Now the best part.** Cost. Out of the 17 channels I have listed for NRECA, only four have a monthly direct charge associated with them! The top buck here is under \$2 (HTN) and the rest are in the peanut category. That means that with the cost of uplinking and off-air processing and billing, NRECA could meet their stated goal of \$10 a month with ease. They'd make so much money they could pay back their 10,000,000 REA customers who loaned them the initial \$120,000,000 satellite seed money in a year or two.

Not all TVRO dealers are delighted with the prospect of NRECA getting into the programming distribution business. These dealers worry that if the NRECA is going to sell programs, they may also sell equipment. I am not worried. The NRECA could just as easily contract out the installation of TVRO hardware and they might even be talked into allowing those farmers who didn't want to buy from their local rural co-op to buy elsewhere and still enjoy the service. I figure we are better off having a strong, low-cost programming package AND the NRECA selling terminals out there than not having a low cost programming package and *nobody* selling terminals.

SO I am not "agin" the NRECA intentions here. But I do believe they stumbled into Washington back in June without being really prepared for the political reality of tangling with the strong and unusually effective cable "lobby". And that's OK; no real harm has been done at this point and after the NRECA has tangled with the cable folks for a few months, they will be ready to consider a different approach.

My fore-fathers didn't like the toll roads so they took to the rivers. It worked and America got settled even if the toll road operators lost their monopoly. Cable thinks they own the satellite toll roads exclusively. And I figure it is time someone like the NRECA opened up a new river or two to the heavens. ▀



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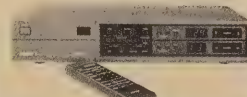
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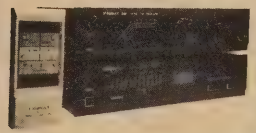
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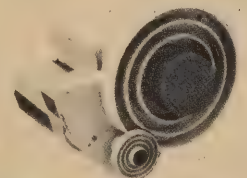
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**W**hile the U.S. is generally considered to be the country of television-plenty and European countries are considered television-starved there is one exception to the rule—Italy. As late as 1970, television in Italy was controlled by RAI, the state-run communications monopoly, which telecast a limited menu of black-and-white television on two frequencies for about eight hours each day. Programming was quite good, offering a mixture of movies, sports, news, live entertainment specials and cultural events.

Due to the extremely mountainous nature of the Italian terrain it was necessary to re-transmit these network signals to remote valleys and areas cut off by the topography. As a result a

vast number (tens of thousands) of repeater and translator stations were installed throughout the country. These repeaters were extremely inexpensive and were generally installed on poles at a convenient high point to boost the signal to the towns in the valley below. In this manner, television reached virtually 100% of the Italian population and their thirst for this new entertainment medium was insatiable.

Taking advantage of non-existent legislation covering the area of television transmission, Italians rushed to apply for licenses and to build transmitting stations to supply this TV-hunger. Originally located near Italy's northern borders, these new "private" TV stations would re-transmit programming picked up from Switzerland,

France, Monte Carlo and even Yugoslavia. Pretty soon these "televisioni private" started transmitting their own programming, much of which was sexually oriented and carried lucrative advertising.

Out of this chaos there emerged one figure, Silvio Berlusconi, who today dominates the Italian television scene. Much as Ted Turner revolutionized television in the U.S. when he turned his little Atlanta UHF station into super-station WTBS, so Berlusconi transformed a series of unconnected UHF stations into three new national "network" stations: Canale 5, Italia 1 and Retequattro. The programming staples of these super-stations is made up virtually in its entirety of U.S. series, sit-coms, movies and soaps, all dubbed



**Silvio Berlusconi** - *The Ted Turner of Italian TV.*



**Antenna Maze** - *Small stations receive European satellite signals, then retransmit to homes using UHF.*



**"Repeater Towers"** - *Bringing TV to every Italian home.*



into Italian and watched by millions, no matter how strange the subject matter.

On a recent visit to Milan I was able to relive (in Italian) some episodes which aired in the U.S. some years ago of "Dallas", "Dynasty" and "Falcon Crest" as well as old episodes of the "Mary Tyler Moore Show", "Alice", "I Love Lucy", "Kojak" and (of all things) "The Jeffersons". The favorite soaps are "General Hospital" and "Guiding Light" ("Sentieri") and are as avidly watched and discussed as they are here. Almost all Italians can choose from six national network TV stations but they can also receive as many as 12 additional local and regional TV stations.

And that is where satellite television

comes in. With about 10 channels of satellite television from all over Europe available from ECS I and another five from the Intelsat V-11 satellite available all kinds of low power television stations (LPTV's) have sprung up which re-broadcast programming like "Music Box" (a British clone of MTV), "Sports Channel" and "CNN". Yes, the same CNN Headline News which you receive in the U.S. is simulTVcast to Europe and can be received quite easily on a four-foot dish. I asked why anyone would watch such programming in a foreign language and, more importantly, why any company would bother to advertise on such a TV station. The answer seems to be that Italians have an insatiable thirst for what comes over the cathode ray tube and

that they will watch anything, in any language, in any format. And the advertising can be pin-pointed to a very small geographical region and to a very defined target group.

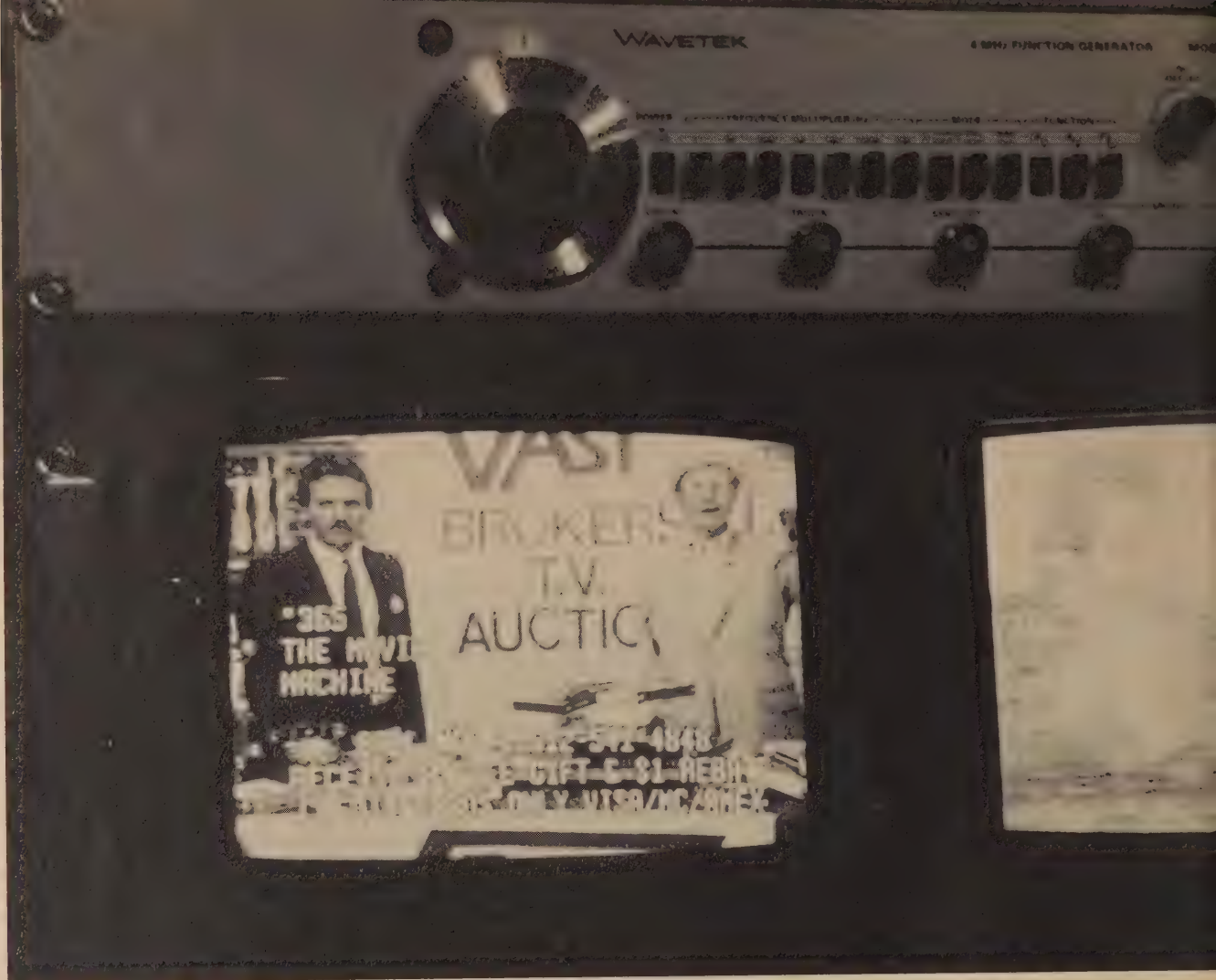
In this desire to broaden the horizons of television may lie the future of satellite television in Italy and Europe in general. A Turkish friend of mine who is involved in back-yard satellite dishes in the Istanbul area told me that his customers will even watch Norwegian religious programs off satellite in preference to the one channel of black-and-white Turkish TV. As more and better programming goes up on satellite and the cost of the equipment and size of the dishes goes down there may develop a large TVRO business throughout Europe. ✎

BY PETER SUTRO

# TVRO In Italy

*They're Starving For Programming,  
And Satellites Are The Answer*





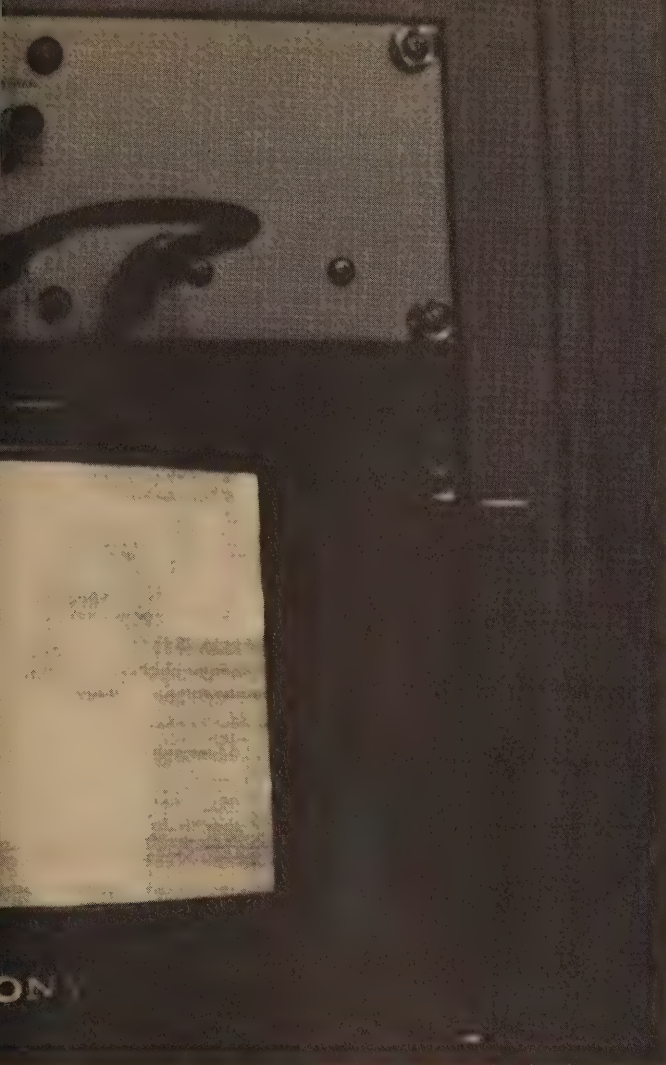
# Home Dish Only

BY SCOTT MEHNO

*Very Special  
Networks  
Programming  
To Your  
Special Interests*







**Just for Satellite Owners** - New programming is filling the screen this fall aimed exclusively at those who own dishes. HDO spokesman, "The Descrambler Guy" (bottom left) announces fulltime horror movies. HDO comes from PKO-TV, the people who put out "The Extasy Channel."



**C**ontrary to all the hype being put out lately, TVRO screens will not go dark due to lack of programming. Though scrambling has taken its toll on dish owner's choices, it has also created an added incentive for new networks to establish themselves with the TVRO buff looking for original programming on their television screens. Many new programmers have emerged in the best TVRO entrepreneurial spirit, announcing plans for direct satellite-to-dish owner networks this fall.

Narrowcasting seems to be the buzz word as many of the networks will gear their programming to particular areas of interest. Everything from shopping networks to horror channels will be made available. Almost all of it will be free to satellite dish owners, thereby taking up the challenge that cable was supposed to fulfill in the early 70s.

Many of the new networks have sprung from satellite dealers trying to add some programming variety for dish owners. One such plan has been unveiled by Cabletech Systems, located in the suburbs of New York City. Larry Altman, co-owner of the company, says Cabletech has been developing their Satellite Entertainment Network for over a year now, and plans to launch the nonscrambled network by January, 1987.

"We think the scrambling plans of the major cable networks have created tremendous opportunity for more diverse programming elsewhere" says Altman. He himself has a film background, having graduated from the University of Southern California in film. He and his brother Barry, who runs the engineering portion of the company, have lined up committed television sponsors for the network.

"We want it to be a mixture of MTV like programming and movies. A lot of original programming will also be aired on the network," Altman says the network will air its programming during a 6-11 p.m. timeslot to be designated later this fall. "The commercial response for such a network has been unbelievable," says Altman. "I think its about time for alternative types of programming to be seen on satellite TV. That's one of the reasons people have the dishes in the first place."

Alternatives have certainly been cropping up faster than ever for TVRO videophiles. One Colorado based broadcaster is gearing his new network to begin airing this fall. Ken Weare, president of MBC (Modern Broadcasting Company) in Colorado Springs, Colo. says the network will originate from a Telstar 303 transponder and transmit as a four-hour a day network.

"We will be on channel 18 from 1:45 in the afternoon to 5:45," says Weare. The network will switch to 24 hours a day later in the fall. The initial schedule will consist of a merchandising format where shoppers can pick and choose wares offered on the channel. "We have over 1,000 new products that are slated to be advertised," says Weare. "We are trying to raise enough money so that films can be purchased to round out the schedule."

MBC has also negotiated deals with several cable companies, so that the network itself will be seen throughout the country on different channels. Weare expects a total viewing audience for MBC to be somewhere around 25 million homes by mid-1987.

The idea of shopping networks is not a new one to TVRO. The Home Shopping Network, one of the first of the television buying guides for dish owners, has already proven to be one of the most successful independent satellite networks. It will soon be joined by another narrowcast shopping entity, the Cable Value Network (CVN). CVN,





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# Home Dish Only

which is to be backed by TCI will be Minneapolis based, and feature mostly premium items for those homes with more than just a casual interest in the good life. CVN will operate from 8 p.m. to 4 a.m. on weekdays and 24 hours on weekends.

For those dishowners wondering whatever happened to just "good ol' fashioned movies" on the homescreen, don't fret. TVRO entrepreneurs are hard at work offering up various movie channels for the discriminating TVRO taste-buds. One outfit already in progress is The Movie Network (TMN) operating out of Conroe, Texas.

Though admittedly low-budget, TVN makes up in chutzpah what it lacks in marketing dollars, by bringing you entertaining off-the-wall fare most of which are public domain features. The network can be picked up on SpaceNet 1, Transponder 13, from 8 p.m. to midnight on weekdays. If you're tired of the constant repetition on HBO, TVN just may be the wacky alternative you've been looking for. And if you like what you see, they even have an address where you can send your donation to help keep the tough little network going.

If you need something with a little more spice to get you to switch channels, then it's no surprise that PKO Television, creators of the first satellite adult service, the Extasy Channel, is behind the nation's first "Horror" Network. Jeff Younger, vice-president of the network says the service will be called HDO (Home Dish Only).

"It will be scrambled, and compatible with your videocipher II," says Younger. "During the week we will have first run films, but during Saturday and Sunday we'll be offering what we call "Splatter Weekend", filled with the ghastliest horror movies ever seen." Younger says even the commercials on the network will be in the horror vein. Younger is confident that HDO will succeed. "Most of the other major networks have announced scrambling plans, HDO will be a viable alternative because of the type of programming and lower subscription charge," he says.

"We plan to charge only \$120 a year for both the weekday and the weekend services. I think our channel will be much more fun to watch." For all you Dracula freaks out there, Younger says the network is also on the lookout for a "horror host" to act as spokesperson for some of the splatter-fodder they'll be showing during the course of the programming schedule.

If being scared is not your bag, however, maybe strictly business is. Data services, as well as office-oriented programming will also be cropping up on TVRO screens this fall. The Satellite Data Network, beamed up on the audio subcarriers of Galaxy 1, transponder 15, is perhaps the foremost of the business services. Originating out of Chicago, SDN details the latest economic and Wall Street coverage, financial market reviews, and precious metals and dollar quotations. Available as a subscription service, viewers can utilize the service with any compatible IBM personal computer and six-foot or larger dish. Another service offered by SDN provides the top 24 business stories of the day, as well as updates on AMEX, NASDAX, and the New York Stock Exchange.

For farming buffs the network also has a comparable system in the Agriculture arena, culling information from AgriData, the largest farming information center in the country. The service offers weather, livestock, and the latest farming news 24 hours a day. Dish owners wanting the service need only a \$700 subscription payment and a

personal computer that utilizes the DM-100 demodulator that serves as the interface between computer and the satellite network.

Another more wide-ranging business service available to home satellite users is Tunnelvision. Created by First Houston Capitol Resources Fund, the network is targeted for a larger variety of business interests by taking consumer and trade magazine business stories and translating them onto video.

SPACE, the industry's largest trade organization has also stepped into the programming circle by launching a weekly service aimed at dishowners called Earth Station Network (ESN). The network will cover all areas of major interest to dish users such as Congressional hearings on TVRO issues, and taped reports emanating from trade-shows across the country. One of its regular programs is called SPACE/Showtime, narrowcasting on SPACENET 1, transponder 19. Co-produced by Nova Video productions, the program concentrates on hot issues such as zoning, scrambling, and supplies necessary legal and technical information provided by the SPACE law firm, Brown and Finn.

If all this technical information moves you into video overload, take heart. A St. Louis based dealer, Carolyn Fite, is evolving a dish-information network with a more personable approach. Headquartered in Quail Valley, CA, Fite has started the Independent Satellite TV Network, an all-call-in network designed to create a forum for TVRO buffs looking to air their beefs. The network is beamed in on Spacenet 1, transponder 9 and also utilizes unused hours of the FUN Network. Running four hours a night, dishowners can tune into programs like "Dealer Connection", "Computers Bite Back" and even "The World of Parapsychology" for all those viewers looking to get back at their dealer through metaphysics rather than the better business bureau. Advertisers are currently being secured to support the network.

One thing almost all of these satellite direct services have in common is their relative independence to already existing satellite networks. Like the TVRO industry they serve, these budding networks are pioneers in a television era that has found itself with more channels than programming. The foibles and pitfalls of such risk taking are likely to be many, with the probability that most of the new services may not outlive the broadcasting season. The important thing to remember, however, is that alternate sources of programming are finally starting to appear. The Turners, and the HBOs and NBCs keep hyping their "satellite networks" and special projects for the TVRO industry, but it's the same type of person who helped discover the industry in the first place, the garage entrepreneur, who is making inroads into satellite-direct programming ventures.

The next time you flip through your dial, pay a little more attention to these networks that lie just off the beaten path, like TVRO itself, you may just get more than you bargained for. ♣

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***One thing almost all of these  
satellite direct services have in  
common is their relative  
independence to already existing  
satellite networks.***

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# In Search Of The ULTIMATE Picture

## *How To "Audition" Your Next Television Set*

BY JIM VINES

**G**etting the right *kind* of TV to go with your home satellite TVRO system is as important as getting the right kind of TVRO system.

The main reason any rational consumer has for buying a new television is to get a *better picture*. Forget about the cabinetry, forget about the remote control; because all of that can be considered after you've narrowed your search for the best in video quality.

Here's how to "audition" the televisions on display at your local retailers:

**CONTRAST:** Identified as "Picture" on Sony TVs, this control is often pushed to excessive levels by both the buying public and by sales people. Fine detail resolution is sacrificed, and with some TVs a phenomenon known to video engineers as "blooming" is observed around the whites of peoples' eyes, movie credits, ballgame scores, etc. (Photos show severe blooming even after a certain make/model of 25 inch TV's contrast has been reduced.)

**BRIGHTNESS:** Called "Black Level" on many RCA and Zenith TVs, this control should be adjusted so that high-light areas aren't washed out and so that areas that should be black *are* black. By keeping the brightness (and contrast) adjusted to moderate levels you'll also find that the "Color" level can be backed off, because the reduced brightness (increased "blackness") results in increased color saturation.

**COLOR:** Enough but not too much. You can obtain excellent color saturation with the "Color" level reduced, if you also maintain the "Contrast" and "Brightness" at slightly reduced levels, as noted above. Increase the "Color" level until graininess is observed in bright reds, blues, etc.; and then back off a tad.

**TINT:** Also called "Hue." In the absence of a local station broadcasting color bar test patterns during normal business hours, flesh tones (faces) are a reliable indicator of whether "Hue" has been adjusted correctly.

**SHARPNESS:** Now we come to the bottom line. If you observe a sudden increase in snow or graininess as "Sharpness" is increased, back off a little but not so far that fine detail is lost.

When TV talk turns to sharpness, everybody and his chiropractor whips out the latest Special Issue of this or that video magazine to compare manufacturers' "specs."

Alas, specifications are little more than ink on paper. In comparing specification of monitors (more on moni-

tors later), one discovers that virtually all claim something like 330 vertical lines of resolution across their screens with a broadcast (modulated) signal; and 400 lines with a "baseband" (unmodulated) signal (more on this later, too!)

At one time or another you've probably seen a black and white TV test pattern with vertical and horizontal line displays wherein the lines converge and at some point merge. Turn the contrast and brightness controls up and the lines merge or blur together even at the 100 level. But if you reduce the contrast and brightness levels, the lines can be separately resolved to beyond the 300 level with a top quality TV (assuming it's working with a broadcast signal).

"Some manufacturers apparently rate their TVs' resolving capabilities at a very low contrast setting. Almost any TV can resolve fine details when the contrast is adjusted at low level." The voice was that of Bob Christofanelli (Earthstar Corp., South Chicago Heights, Illinois), with whom I've done a number of textbook TVRO installations over the years.

Meanwhile, back in your favorite retailer's TV display room, you've discovered that not all TVs behave the same when their sharpness is increased. With some, an increase in sharpness level can turn the picture into a wierd-looking base-relief with ghost ridges running parallel to subject outlines.

"Poor 'anti-ringing' circuitry is one reason for ghost ridging," Christofanelli noted.

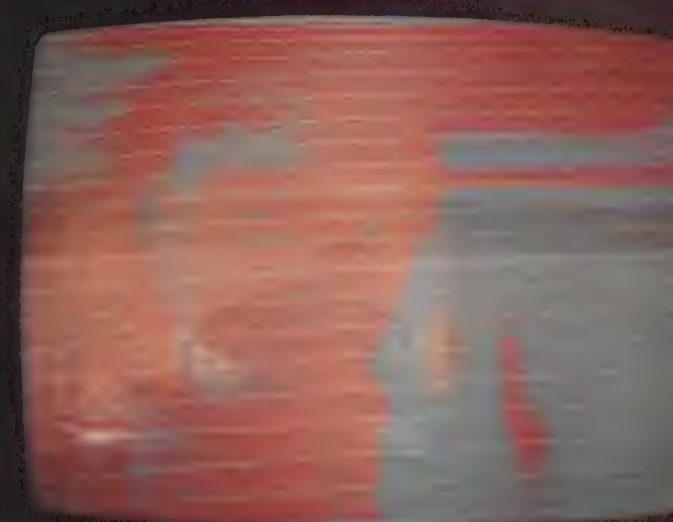
"Further, the average TV tuner has an across-the-channel sensitivity curve that's bell-shaped. When you crank up the

*Continued on page 62*

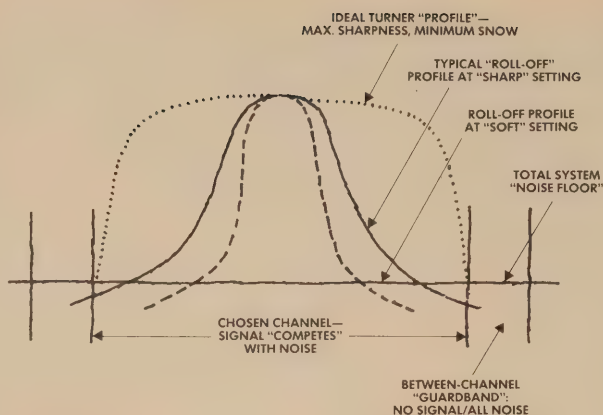
**What To Look For -** Poor visual images from a variety of causes (photos have been exaggerated to show bad qualities).

Top left, then clockwise: distortion; lack of sharpness; poor control of color or hue; "blanking" from overloading of contrast and brightness; graininess; and "halo" effect or "blooming" around highlighted areas caused by poor contrast control.



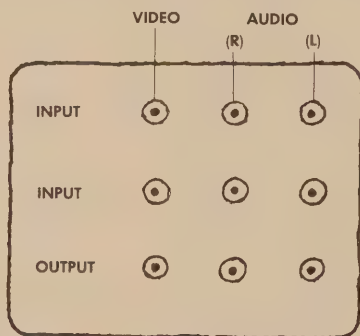






**DIAGRAM 1.** Ideal versus average TV tuner "sensitivity profiles." The best tuners come relatively close to achieving a "square" profile, thus resolving the finest details while not veiling them behind "snow." Snow is thermal noise. Sources of noise (or snow) are your TV's tuner, signal losses that occur along the transmission line, and the Earth itself.

The fastest, surest way to improve your reception quality is to install a good outdoor TV antenna and coaxial cable; which will drastically lower your TV system's "noise floor."



**DIAGRAM 2.** A-V inputs allow a TV monitor to "monitor" video direct and unmutated from a satellite receiver (or a VCR); no more tuning your old-style TV to channel 3 or 4.

Audio inputs can remain unused; audio from satellite stereo processor (and/or from Hi-Fi/Stereo VCR) should be routed to "Auxiliary" inputs on backside of stereo system amplifier.

## Ultimate Picture

average TV's sharpness level, you're causing its tuner to see beyond the channel edges, into the guardbands which separate the chosen channel from the adjacent channels. (Ref. Diagram 1)

"Ideally you'd have a sensitivity profile that looks like a classical square wave—flat across the entire channel (for maximum sharpness) with abrupt cutoffs at both of the channel edges. The result would be very sharp pictures with no snow. Almost like a photograph."

Within the guard bands there is no signal, only noise. So when sharpness is increased the result is a sudden blizzard of snow. The snow obscures subtle variations in shade or tone, as well as textural details.

And the ghost ridges? Christofanelli again: "As we know, a TV picture is made up of field scans. Two times 262½, or 525 field scans or lines make up a complete picture."

So far, so good. Those horizontal lines that you can barely see going across your TV screen are the building blocks that make up your TV picture. And each of those lines is scanned across your TV screen in approximately 1/8000 of

a second, registering (as faithfully as possible) the many transitions from light to dark, from one color to another; no matter how abrupt or close together they may be.

"When you consider how many transitions in color and shade there are as a single line scans across a plaid shirt (for example)," Christofanelli observed, "you can appreciate why video engineers have begun addressing the challenge of faithful video reproduction in the same way as audio engineers approach the challenge of intermodulation and harmonic distortion."

Audio reproduction is sound versus time. Video is the reproduction (accurate, we hope) of shade and color versus time, via field scan lines that traverse your TV screen. Imagine what must happen for your television to faithfully reproduce the stripes on a football referee's shirt! No wonder video engineers are increasingly concerning themselves with "rise time," "slew rate," "intermod," and "white clip level!"

Since satellite television is (usually) of superior quality, it behooves us to have the best possible TV instrument to view it with; ideally a "monitor." A monitor has special audio and video inputs (and sometimes outputs, too) on its backside. These inputs and outputs allow you to extract baseband audio and video from your VCR which (you may have noticed) also has A-V inputs and outputs; or from your satellite receiver.

With an ordinary TV you must tune to channel 3 or 4 to watch modulated video from a VCR, laser disc player, or satellite receiver. Each of these has a component within which is called a modulator; which in reality is a miniature TV transmitter.

Hopefully the modulator inside of your satellite TV receiver has a square output profile, just as (also hopefully) your TV set's tuner (when tuned to channel 3 or 4) has a square sensitivity profile."

Earthstar's Christofanelli again: "The best CATV head-end modulators (which are separate, cut-to-channel, rack-mounted instruments) approach the square profile rather closely."

But if you're after the *ultimate picture* you must have a monitor. Then and only then can you extract the original video waveform, as it originated in the studio, unmutated by a modulator. Unmodulated video, extracted from a high quality satellite receiver, is so good you'll do almost anything to have it in your home; like not buying that BMW you've been drooling over.

Unmodulated (ie. baseband) video can also reveal any shortcomings your monitor may have. Because baseband video contains more detail (per each field scan line) it will require your monitor to faithfully reproduce tighter, more abrupt, and often subtler field scan transitions in shade (luminance) and color (chrominance) than any ordinary TV can.

A good monitor isn't cheap. One might call it an investment. So when I bought my 45 inch monitor at Marshall Field's I asked Dale DiGrazia about the manufacturer's warranty, and whether I could buy additional warranty coverage from Field's. I know modern solid state equipment is reliable. I also know it can be expensive to fix, and that it can fail suddenly.

So when Dale DiGrazia explained the advantages of his store's Home Electronics Protection Plan, I purchased the "H.E.P.P." along with my new 45-inch monitor. Dale reflected: "You know how much it costs to buy your monitor. But can you predict how much it'll cost you to own it over the crucial first three years of its life?"



# Super TV

## TV in 3-D

### *JVC Adds A Dimension Using Binocular Parallax*

**I**t's finally happened—3D has come to television! Well, almost.

Back in the 1950s when TV first exploded into American life, movie theaters were hard hit. People stayed home watching the tube instead of going to the corner bijou.

Largely as a way of recapturing errant viewers, the movie industry introduced 3-dimensional movies. And it worked—for a time. The new techno-

logy captivated the public and theaters were again full, this time with viewers who sat wearing special red and green (or blue) glasses which allowed them to see 3-D effects onscreen.

There were problems, however. Besides the awkwardness of the glasses, the public soon discovered that the programming wasn't very good. Very few top-notch 3-D movies were made. A great many very bad ones that fea-

tured mad scientists pointing hypodermic needles at the audience or giant frogs jumping into the first few rows or other "tricks" came out. Soon the movie audiences said, "Ho-hum" and 3-D died.

It was briefly resurrected in 1985 for a new series of rather awful movies whereupon it once again passed from sight.

Now, however, JVC Company of America has announced a new 3-D product that works, remarkably, on your home TV! Although not yet available to consumers, as soon as it arrives on the market it will allow for 3-D viewing from any television set.

The required components are a standard Video disc player, a 3-D adapter unit and, of course, special glasses. 3-D discs are specially prepared and record images for right and left-eye viewing separately. These are then fed through the adapter which sends separate right and left signals to the glasses.

Unlike the theatre 3-D, however, which featured different colored lenses, TV-3D work on the principle of binocular parallax. The glasses are built with super high-speed liquid crystal shutters that switch back and forth between right and left. The effect is that the image on the TV appears to be 3-dimensional. (Of course standard 2-dimensional viewing can also be seen simply by not using the glasses.)

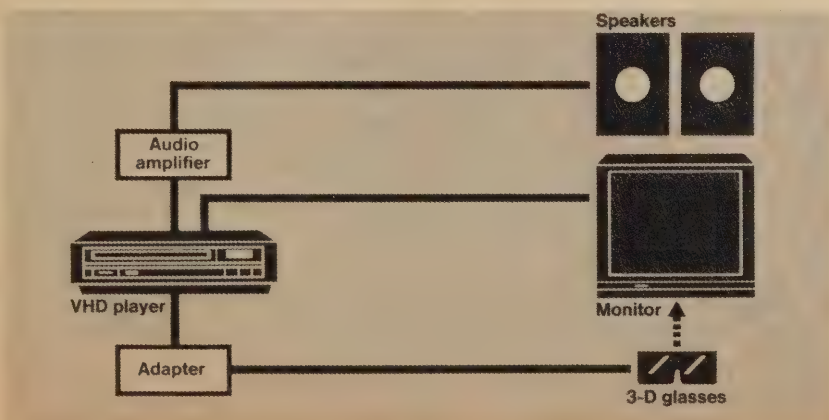
The current models feature hand held lenses that may be placed before the eyes. The result is amazing. This writer watched nearly an hour of such 3-D and the performance was far superior to anything the theatres ever offered.

Of course, the drawback remains the need to have special glasses. And, as with the theaters, the real test of whether or not the public will go for it will be just how good the programming is. 3-D can do wonders for special effect, but it can't make a good story out of a bad one.

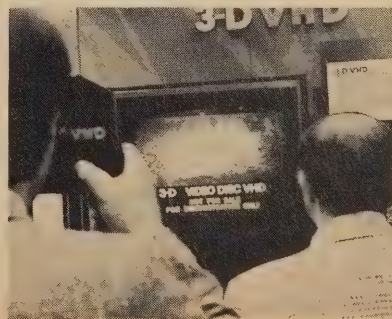
- by Bob Wolenik



**Hand-held Viewers** - A requirement for the new 3-D TV



### **Special Effects -** *Must be created for 3-D*









# Satellite TV With A REALLY BIG DISH

## *Think Of The Signals You Can Get With A 30-Foot Dish*

BY JIM VINES

**H**ave you ever wondered what it'd be like if you could go "bird hunting" with a really big dish? I mean a *really ...big... dish?*

Not so long ago this Contributing Editor broke the United Video's Chicago Teleport, located among the cornfields near rural Monee, Illinois and proceeded to terrorize the occupants as he commandeered (another word for "hijacked") U-V's brand-new Andrew Corp. 30 foot steerable dish.

While diverting U-V's management and staff with fresh copies of HSTV, Yours Truly had enough time to quickly check his Findex "sky map" for Monee, Illinois and "hit" Intelsat V F8 just long enough to snap several photos of World Cup Soccer *live* from Mexico City.

The enclosed photos were taken off of one of the four (Four!) Mitsubishi 40-inch rear projection monitor TVs that U-V uses to check the downlink quality of Superstation WGN-TV (which they uplink to Galaxy One from the same site). These 40-inch TVs are operated 24 hours daily, 52 weeks a year; and after 18 months of continuous operation they show no signs of deterioration. According to Bill Hartanovich, (Manager of Satellite Operations and Engineering) "We use these big TVs to monitor the quality of every video service that we uplink here, plus a few others on a contract basis. There's no substitute for a large, very high quality TV to scrutinize the downlinked signal from the satellite for any flaws before they become apparent to viewers across the USA." From Walla Walla, Washington to Bangor, Maine; and from Bismark, North Dakota to Brownsville, Texas.

**In Search Of The Perfect Picture** - United Video's giant dish captures signals which are displayed on 40 inch monitors—all with the goal of creating better viewing for you. Chicago Teleport operates 24 hours a day uplinking WGN-TV and other programming while checking the downlinked signal.

So here we were, watching the World Cup live via Intelsat—instead of via a local TV station, which got the World Cup via terrestrial microwave, from a local TVRO, which got it from a U.S. satellite, which got it from a U.S. uplink site, which got it from and Intelsat V F8 "hemispherical beam" transponder.

While an Intelsat "hemi-beam" transponder won't irradiate your backyard nearly as strongly as, say Galaxy One, it's a lot stronger than a "global beam" transponder; especially one that being operated in a (fairly typical for Intelsat) "backed-off" mode. In a book-in-progress by this writer, the *Intelsat Challenge* is considered in depth, here we will explore it more briefly.

As we have observed, an Intelsat "hemi" beam transponder is not very powerful; about one-sixth as powerful as, say, Galaxy One. Whereas Galaxy One and other DOMSATs can irradiate your backyard to the tune of 36 decibel-watts (dBw), a hemi-beam transponder on a "V"-series perhaps 33 dBw except for the practice-common with Intelsat—to operate at less than full "saturation"; or backed-off.

Further compounding the problem is the circularly polarized signal; your dish's linearly-polarized DOMSAT feed will pick up the Intelsat signal but only one-half of it. Chalk up another 3 dB penalty. Not a lot to play with, but like being buried in Philadelphia there are worse things to be stuck with.

There are two things for us to calculate in order to predict what degree of sensitivity we must have at the "downlink" end of the equation; given the 28 dBw signal we had to work with. The first is the input "carrier-to-noise ratio" (CNR) at the input spigot of your receiver; and it is obtained with the following formula:

$$\text{Receiver "threshold" CNR} = G/T \text{ (of the TVRO system)} \\ + \text{dBw (of satellite signal at TVRO site)} \\ - \text{"Path Loss Factor"}$$

More simply:

$$\text{CNR} = G/T + \text{dBw} - \text{Path Loss Factor}$$

Now to plug in some numbers:

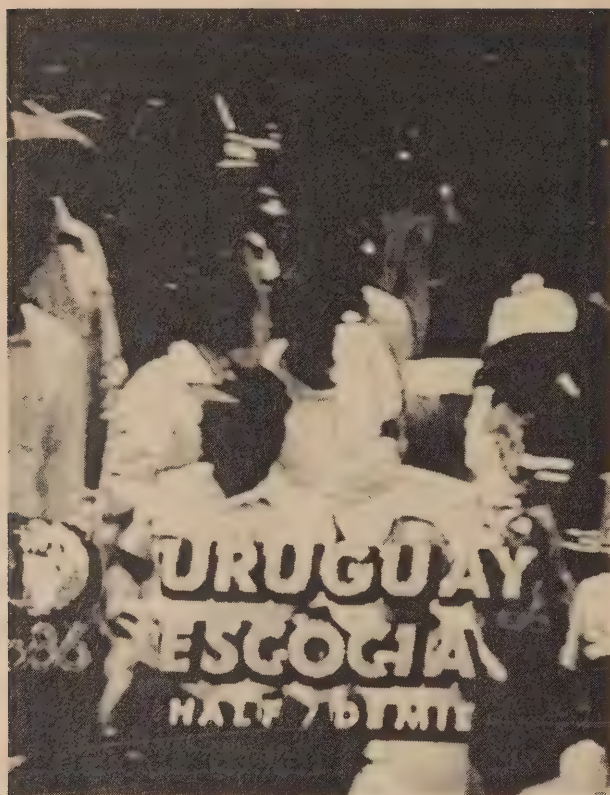
$$\text{CNR of 9 dB} = 27 \text{ dB/K} + 28 \text{ dBw} - 43 \text{ 'PLF',"}$$

-3 dB if a DOMSAT feed is used.

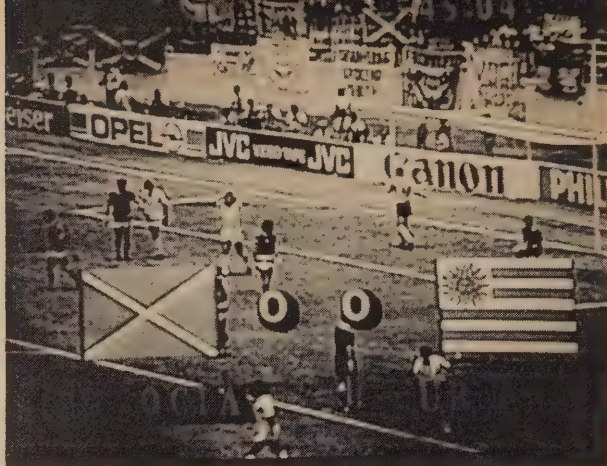
This says that to clean out all but the last sparklies that "hit" in bright colors (reds in particular), you'll need a *very*



# Really Big Dish



**World Cup Soccer** - Live and direct on the big dish.



**Uplink Quality** - A perfect picture without loss.



**Direct from Intelsat** - Actuator shows dish position.



## GLOBAL VILLAGE CONCEPT CREATED BY SATELLITES

By Mark Long \$7.95

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good 15 foot dish (equipped with a circularly-polarized feed) and a 70° Kelvin LNA. You'll require a very good 21 foot dish if you have to make do with a linearly polarized (DOMSAT) feed.

The second thing we must calculate is the G/T of our TVRO system. G/T (or "G over T") means "gain over noise temperature." G/T is a measure of antenna gain versus three sources of "noise temperature," which are: 1) antenna noise temperature which is a measure of the antenna's ability to resist being "blinded" by off-axis sources in interference such as thermal noise from the Earth, 2) LNA noise temperature, and 3) other sources of noise such as cable losses, receiver noise, etc.

All of these sources of noise are expressed in degrees Kelvin; with the smallest total amount being the best. We must achieve sufficient "system G/T" so that the satellites are "seen" by the system as bright points of "4 GHz light" against a dark sky. Our formula:

System G/T =  $G_{\text{Antenna}} - \text{Log}_{10}(T_{\text{Antenna}} + T_{\text{LNA}} + T_{\text{Other}})$

Now to plug in some numbers: Our 21-foot DOMSAT fed antenna's gain will be 46.8 dBi and its noise temperature (given a look angle of at least 30 degrees above the horizon) is 20 degrees Kelvin. The LNA's noise temperature is 70 degrees Kelvin and the noise contribution of other sources is 5 degrees K.

So our total system noise is 95 degrees K; which converts to a Log<sub>10</sub> value of 19.8. The 19.8 gets subtracted from our antenna gain of 46.8 dBi; and the answer (27) is the G/T our system must have (expressed in decibels/Kelvin, or dB/K).

Given a receiver carrier-to-noise "threshold sensitivity" of 9 dB, and a satellite footprint value of 25 dBw at our TVRO site, and a path loss factor (which we won't even bother to explain here!) of 43 the 27 dB/K tells us "how high we must jump." And what must we jump over?

The threshold CNR sensitivity level of the receiver; assumed here to be 9 dB.

The "eye" of any TVRO system is the antenna. Having seen the custom-installed dishes of a certain Western-Canadian dish manufacturer roundly outperform costlier conventional dishes across the High Arctic, this writer/designer/installer is quick to point out that real world dish performance will equal printed specs only when the dish is competently assembled and tested for surface accuracy.

How well does the United Video system "spec out"?

$$\begin{aligned} G/T &= G_{\text{Antenna}} - \text{Log}_{10}(T_{\text{Antenna}} + T_{\text{LNA}} + T_{\text{Other}}) \\ &= 50.6 \text{ dBi} - \text{Log}_{10}(20^\circ \text{ K} + 40^\circ \text{ K} + 3^\circ \text{ K}) \\ &= 50.6 \text{ dBi} - \text{Log}_{10}(63^\circ \text{ K}) \\ &= 50.6 \text{ dBi} - 18 = 32.6 \text{ dB/K} \end{aligned}$$

Given the "World Cup" signal we had to work with, what kind of receiver carrier-to-noise level did we achieve? The dish was fitted with a linearly-polarized DOMSAT feed "system" (for both uplinking and downlinking). The linear polarization of the feed imposed an automatic 3 dB system handicap for reception of Intelsat's circularly-polarized signal. Our C-N ratio (considering the 3 dB handicap) should've been in the neighborhood of 14.6 dB.

It was. ♣

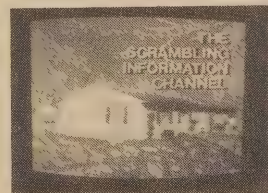
NOTE: Jim Vines is one of a handful of satellite antenna designers who truly know the ins and out of designing big antennas. Questions about big dishes can be addressed to Jim at P.O. Box 448, Monee, Illinois 60449-0448. The fast-moving Vines can (sometimes) be phoned at (312) 534-0889.

# SCRAMBLE-FAX SCRAMBLE-FAX SCRAMBLE-FAX

by Bob Cooper

IF satellite scrambling is important to you, here is a single, authoritative source of timely, confidential information of great value; **SCRAMBLE-FAX**. Bob Cooper is routinely gathering all of the important scrambling facts and combining them into a single AIR-mailed 'Newsletter' designed to give you all of the facts you need in one, convenient, timely place.

**SOURCES** for pirate decoders, reports on export problems and equipment interfacing solutions. Advance warning on who is scrambling, when, and how (more than 37 channels have already scrambled; 20 with Oak Orion). All of the important, hard to locate information, in one publication.



**COMPLETE**, up-to-date listings on which receivers interface with the 'E' and 'E/B' version Videocipher descramblers; full table listing or who is scrambling, using which system. Technical tips for interfacing descramblers with commonly available receivers.

**STATUS** reports from DESug (DES Users Group) on progress made in 'busting' the videocipher coding; analysis of plans and books offered in field and value of each to users. Conversion of non-compatible equipment to Videocipher interconnection, and, much more!

WESTAR Communications/Westcom, the Toronto area alleged manufacturer of 'pirate decoders' for HBO/Showtime and other Videocipher type scrambled services reportedly has been sold to a new group of investors: all Canadian. The firm has been offering their pirate-type decoder unit for \$500 (US) for several weeks claiming it decodes all Videocipher scrambled video plus audio signals. Attempts to locate the firm other than through their 800 telephone number (1-800/265-5675) typically meet with failure and the firm is quick to explain that it would be inappropriate for them to identify their actual street address location (SCRAMBLE-FAX suggests you try 504 Iroquois Shore, Oakville, Ontario, and 416/842-2877 as their non-800 telco).

**AND** you are invited to call 305/771/0575 anytime for a free, 3 minute pre-recorded 'SCRAMBLE-FAX Hotline Update' report; the latest in fast-breaking scrambling news to augment your printed copy of SCRAMBLE-FAX. To order SCRAMBLE-FAX, call 305/771-0505 with your VISA/Mastercharge card number and expiration date. Or send \$10 check or money order to the **CSD** address below.

## SCRAMBLE-FAX tm by Bob Cooper

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*Learning Via Satellite - Professor Catherine Hankins at Onondaga Community College sets the transponder as Ron Peterson (center) of Pico Products and Dr. Bruce Leslie of the college look on.*

# SATELLITES Go To COLLEGE

*Higher Learning  
Is Just Discovering  
What A Tool  
A Dish Can Be*

**Tuning In** - Departments get first hand information via satellite. Gil Hodges (hand on dish) of Pico explains mount mechanics to David Hawkins, college radio/TV Chief Engineer.

**T**he best place to study Italian? Italy, of course. The best place to learn broadcasting? Work for a TV news network.

Obvious answers, yes, but difficult ones, too. Most students who really want to get the best possible education

cannot afford the money or do not have the opportunity to study in the field. Rather, they learn by going to school. Thus, in order to give the students a reasonably good education, it becomes the school's job to create a learning situation as close to the real thing as possible. One school, Onondaga Community College in Syracuse,

New York has made a giant stride forward in providing realistic education through the use of a new satellite system. The system allows students of Italian to see and hear what Italian citizens are seeing and hearing. It allows nursing students inside the latest conferences at major medical centers. And it allows broadcasting students to





*Photo courtesy of Dan Chmielewski*

see how major news stories are edited.

Under the direction of Professor Catherine Hawkins, Chairperson of the college's Radio/Television department, Onondaga recently purchased a Pico satellite system. Now, fully installed, the system provides immense benefits.

According to Professor Hawkins,

the system is being used for teleconferencing in the nursing program. Medical conferences are currently televised from the nation's leading medical centers from California to New York. Those conferences can now be seen and heard directly by students at Onondaga.

Students in Spanish and French

languages can now hear programming in the language they are studying picked up off the Spanish language Morelos satellite and the French Canadian birds.

Recently, students of Italian watched President Reagan hold a press conference. However, what the President said was translated into Italian.

The broadcast had originated in Italy for consumption by Italian citizens in their homeland. However, it was rebroadcast over a Canadian satellite for Italian speaking residents on this continent. By picking it up, students at Onondaga were thus able to get a feeling for how Italian is spoken and used in the homeland. Similar broadcasts in German and other foreign languages have been picked up at Onondaga.

David Hawkins, Chief Engineer for Onondaga's Radio/Television department points out the benefits of the new satellite system for students in his department. "We've gotten permission from Turner broadcasting to use their raw feeds. This means that students can see both the original raw broadcast and the later edited version sent to consumers. They thus get an immediate and inside view of broadcast editing."

The equipment used is a Pico TEN 10 foot mesh antenna, two HR-1000 remote control stereo receivers, a PAC-1000 programmable antenna positioner and a MS-4A Multi Receiver Satellite Switch which allows either receiver to view all channels available from any one satellite.

Engineer Hawkins noted that the satellite reception technology will be incorporated into Onondaga's existing on-campus cable TV system and broadcast on previously unused channel 13.

Ron Peterson, Pico's Institutional Sales Manager, said Onondaga contacted him about installing a "High end total function satellite system." He added that Pico's experience in SMATV (Satellite Master Antenna Television) was instrumental in finalizing the agreement.

Engineer Hawkins expressed satisfaction with the system noting that the price tag of \$3,600 made it affordable for Community college use. Professor Hawkins indicated other academic departments at Onondaga are investigating the possible applications of satellite technology as an educational aid. ▀



**H**ome satellite television has joined the ranks of consumer appliances available for rent, and the result is thousands of happy customers and hundreds of thankful dealers.

Within the past year, rental or rent-to-own signs have been going up in satellite dealers' windows across the nation, and the results have been overwhelming. Potential buyers, previously shut out of the marketplace by high prices are coming to the dealers in droves, with some dealers reporting as many as 30 calls per day from a single business card size newspaper ad. And on the other hand, dealers who were hard hit when scrambling cut deeply into home satellite systems sales, are once again enjoying the kind of traffic they once had during the pre-scrambling days. To carry the benefits even farther, manufacturers of dishes and receivers report orders are picking up again this fall, thanks in part to large "fleets" of rental systems being ordered. So far, it seems to be an arrangement which is good for every part of the industry from manufacturer to consumer.

Dealers getting into rentals usually let the customer have two options: renting or renting-to-own. The latter is the more common arrangement and often amounts to little more than a no-down, no credit check way to buy a system at a slightly higher than cash price. The former is usually a short-term agreement (say, for the length of the football season) by persons curious about the product but not wishing to make a long-term commitment. Contracts and prices for the two will vary.

A typical rental agreement in the home satellite industry is being used by Satron, Inc. a national (Englewood, Colo.) company that is attempting to sign up dealers nationwide to rent its systems. The Satron contract calls for the consumer to sign a 12-month contract for the system and put down a \$200 deposit. If the consumer wants out of the contract in 12 months, the system is picked up and the customer is out of the contract. If the customer continues in the contract for three 12-month agreements (36 months), they own it with no additional buy-out. If they want out in less than the original 12-month agreement, they merely lose their deposit. "It's not a contract where we're going to go sue anybody," says Gary Beckman, national sales manager for Satron.

Other agreements vary slightly on Satron's plan. Some require no deposit but charge an installation fee. Others require a small buyout fee at the end of the contract if the consumer wants to own the system. Length of time to own also varies, with some 5-foot portable systems becoming the renter's property in as little as 18 months and some fully-remote 10-foot systems requiring as long as five years. "We basically fit the term to a certain monthly payment" said Hank Lane, owner of Lanco Satellite in Oklahoma City.

Most systems rent for between \$35 and \$60 per month, based on the dealers and distributors surveyed. On the lower end, the dishes were either ring mounts (dishes which sit on the ground and are pointed by hand at the satellites) or hand-cranked polar mounts and are five- and six-foot in diameter. As the size of dish goes up, so does the price. Other features, such as an actuator and a remote receiver also add to the price. A consumer with a 10-foot, fully-remote dish can expect to pay around \$60 per month for the system and often rent it for three to five years before



## Should You Rent-A-Dish?

owning it. This means that a consumer might pay as much as \$3,600 for the system before they are finished.

But for a number of consumers, the rental option is not merely an attractive way to buy, it is the only way to buy. Virtually every dealer questioned said that persons with no credit or persons with poor credit constituted the prime market for satellite rental programs. Dealers cited persons just out of college, persons on social security, and persons with low income as examples of customers who could not get bank financing for satellite television systems they wished to buy. The rental option means that the dealer doesn't have to lose that sale now. "If they've got a job and are even halfway straight, I'll take a chance on them," Lane said.

Even consumers that have excellent credit are sometimes finding that banks will not loan money on home satellite television systems. AVCO Financial Services cut off loans for satellite dishes temporarily over a year ago, fearful that scrambling might cause some consumers to default on their loans for the equipment. (They have since resumed making loans for satellite TV, however). Many consumers who cannot pay cash for the systems or borrow the money are looking to the rental option as a way to have the system they want without taking months or years to save for it.

Another market for rentals are the thousands of con-



# *For Some, It's The Only Way To Go*

sumers who are dissatisfied with the offerings or the price of their local cable company. Bonded Rentals, Inc. of Phoenix has a month-to-month rental program that appeals to those customers who want to try home satellite television with no long-term contract. For \$35, they can rent a portable system, such as the Little Wil by Wilson, and try it for a month. "These people are just tired of cable and they want to see what we can give them for a month," said Bonded Rental's Chuck Eidemiller. "At \$35 we're right down there with cable."

Another advantage of the rentals is shown in the illustration above: try it before you buy. Many consumers have heard so much about scrambling that they are amazed at the number of channels and programs available once they have a system at their disposal. And though it is too early to tell, dealers and distributors involved in renting expect a large percentage of rentals to translate into sales. Some dealers are even renting systems on trailers over the weekend so that would-be buyers could see for themselves what is available with satellite reception that is not available on cable. (An experiment in the Philadelphia metropolitan area showed the power of the try-before-you-buy approach. Thirty homes were given a system for a month as a part of a marketing study. At the end of the month, nearly all of the homes chose to buy the system rather than give it up.) Clearly, satellite television sells itself, and the rental option is one more tool to allow that to happen.

Rental systems, as you might suppose, tend to be basic and durable. No dealer wants to make service calls on equipment rented out, so the systems are built with years of use and abuse in mind.

Few basic systems, for instance, have motorized actuators. Fewer still have remote control receivers since these parts are apt to have a shorter lifetime than the rest of the system. Satron's dish is one of the most durable we have seen. It is made of a substance called Fiberlume by Techno Syntronics Corporation of Conway, Arkansas. It is a smoky-gray fiberglass dish that is both translucent and flexible. In the middle is a wire mesh, made of aluminum (hence the name "fiberlume") that looks to be the consistency of a screen door. You can push on the back of the dish and make it bow out, yet it resumes its shape without cracking or warping, making it a good composition for the potential rigors of the rental market.

If your rental is a portable ring mount, you should know that, while they are easily transported and stored, they are hard to point at a satellite. If you plan to hop from satellite to satellite, it would be worth your money to rent a polar-mounted dish, even if there is an installation fee. One dealer said that he had a rental "fleet" of nearly 200 portables rendered obsolete when HBO scrambled. Most of the renters merely pointed the dish at Galaxy I prior to the scrambling, but when HBO scrambled, they either wanted a better system or no system at all.

In summary, the rental option is attractive for a number of would-be consumers of home satellite television. Scores of renters are now enjoying satellite television without the worry of leaving a system behind when they move. Many renters with low incomes are enjoying their systems after being turned down by the banks. And scores of buyers are enjoying the convenience of monthly payments that renting

provides. But there are at least two drawbacks. First, you are paying for the privilege of renting as opposed to owning, often as much as 50% to 100% more. Second, your options are limited to what the dealer chooses to stock. However, for many, the benefits of immediate, worry-free viewing more than outweigh any of the negatives.

---

## **Questions to ask before you rent.**

With many dealers now offering a rental option, here are some important things to look for before making your decision.

**Who am I renting from?** Make sure your dealer is a bona-fide satellite television dealer and not simply some telephone boiler room operation. You might need service and you will likely need expert help on installation which the telephone bank operation can't give you. Satron and Rent-a-Sat, two national rental franchises, will not give a franchise to someone without a storefront and a proven record in the business.

**Do I recognize the brand of the equipment?** If your dealer isn't renting proven brands, find another one. Some might be buying huge inventories from companies which have gone out of business, meaning that, by the time you rent-to-own, parts are unavailable for the unit.

**What will I pay before I own the system?** If you plan on renting the system long enough to own it, take a calculator and see how much you will pay before the system is yours. A six-foot system that costs \$150 to install and \$35 a month to rent with a \$100 buyout at the end of 24 months would cost you a total of \$1090 dollars—not a bargain by any means.

**What options are available?** First see what you can upgrade at little or no cost, such as a lower temperature LNA. Then, see what you can get at an additional monthly fee. For instance, an actuator might cost an additional \$10 a month, but might be well worth it if you change satellites frequently. Remote control might be another option to explore.

**Who maintains the system and how?** Virtually all rental systems are kept running by the dealer at no extra cost to the consumer. However, there may be a big difference in how the dealer fixes the system. If he has to send the part off for repair or authorization before he can replace it, you might have quite a bit of down time. What you want is a dealer that has the expertise and the authority (if he is a franchised rental operation) to make on-the-spot repairs or replacement of defective parts. Down-time is lost rental money to you and lost viewing time as well.

**What are my responsibilities in maintaining the system?** Most rental companies will want a deposit around \$200 before installing your system. Find out what constitutes an adequate return at the end of the contract period. Will you be responsible for "cosmetic" problems such as cracks? If you choose to turn it in, who removes the pole and transports the dish back to the dealer?

Renting a dish can be the beginning of a rewarding, new experience in home entertainment. But as with any other contract, a little research and clarifying up front can save a lot of problems later. ▽







# Point: Counterpoint

## The Future Of Ku

*Our Top Authorities Come Down  
On Opposite Sides Of The Little Dish*

### Point

BY PETER SUTRO

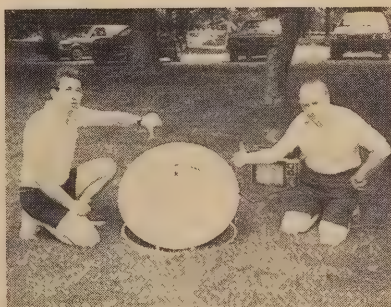
**B**ob Cooper, writing in the September issue of this publication, attacked the future of Ku band characterizing Ku as over-promised and under delivered. I protest.

Ku band is here, now. It is working and I invited Bob and Patti Cooper to my home in New Jersey to prove this contention. Cooper says that everything about Ku 'DBS' depends upon the eventual creation of 100 or 200 watt per transponder satellites. He suggests that the Holiday Inn system, now operating at Ku on G-Star is proof of the failure of Ku since Holiday Inn has elected to install 4.5 meter Ku band dishes. Cooper claims that switching off of C band with a 12 to 15 foot antenna in favor of a 15 foot high precision Ku surface verifies his contention that Ku will not prove a useful service in the near term future. Again, I protest.

#### **Ku - The Wave Of The Future? -**

Some promise dozens of clear channels with dishes no bigger than 2½ feet across, ideal for city dwellers. Others say it'll never happen. Who's right?

Photo courtesy of NEC.



**Ku - Good or Bad? -** While Bob Cooper signals thumbs down and Peter Sutro, thumbs up, the small Ku dish in the middle produces a perfect TV picture.

To prove to this 'Doubting Thomas' that Ku is here, NOW, I arranged with Frank Weeks of DH Antenna in Wisconsin to loan me a small 32 inch diameter dish and patio mount. I selected the 32 inch because this is the largest diameter dish which can be shipped in an 'assembled' state via UPS. I am conscious of the dealer's needs as well as the consumer passion for smaller and smaller reflector surfaces. Was that not the 'promise' of Ku band; really small dishes which were friendly to installer and user alike?

For a receiver, I selected the DX model DSB-500 receiver and the Echo-star (2.2 dB) LNB or low noise block (down) converter. To make this system work, you connect a short length of cable from the DX receiver RF output to your TV set and another length of cable

from the output of the LNB to the (IF) input on the receiver. These cables for most applications can be standard RG-59/U which could be purchased off the rack at Radio Shack for under \$10.

Cooper in Home Satellite TV talks about the great precision and care of Ku band installations and suggests that with everything three times higher in frequency, very small antenna pointing and adjustment errors will make the installation unfriendly. Cooper is correct if you are installing a 4.5 meter dish at Ku. That is true, as he wrote in Home Satellite TV, when you are using a 15-foot dish on this band. The same equipment sized dish at C band would be nearly 45 feet in diameter.

But, and this is the weakness in his original article, none of this is really required. The DH Antenna 32 inch would prove that.

The antenna selected is not expensive; the total cost of the dish and mount is well under \$100; way under actually. The dish sits on a circular ring and to make adjustments in azimuth, you simply 'pin' the ring on a reasonably flat surface. My first tests were on a patio table; with Doubting Coop on hand, we set it on the grass on the lawn after selecting a shady spot. The elevation is a tube that slides in and out inside of a slightly larger tube. The two tubes adjust to a selected, fixed, position with a thumb screw. You need no tools to make this installation.

Now, Coop is right about the low(er) power G-Star/SBS and other non-



# Future of Ku

RCA birds. They do require a bigger antenna and of course, when you are forced to use a larger antenna, you must be far more precise in the dish installation. But when you use the RCA birds with 50 watts per transponder, the stronger signals are a comfortable trade-off with the smaller dishes. And one of the positive trade-offs of a smaller dish is that the dish is no longer as sensitive to pointing errors. It helps if the dish is pointed properly at the satellite, but tolerances are far lower and

you can be sloppy and still watch television.

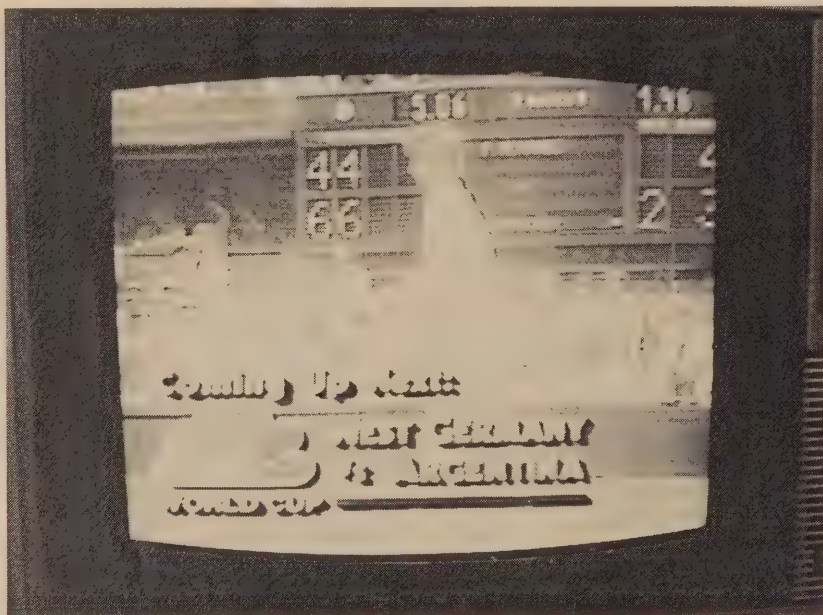
The great test. With the DH Antenna and the DX receiver connected to one another, and a (Sony) monitor providing the video connection, we turned the system on. In less than 30 seconds—pictures. In another 30 seconds, perfect pictures. Had we timed ourselves from packing boxes sealed to reception, perhaps five minutes would have elapsed. A person in a hurry could have done the same job in half the time.

The cost. Dealer pricing in a consumer publication is a no-no. Let's just say that if you added the LNB, antenna and receiver all together, you would be

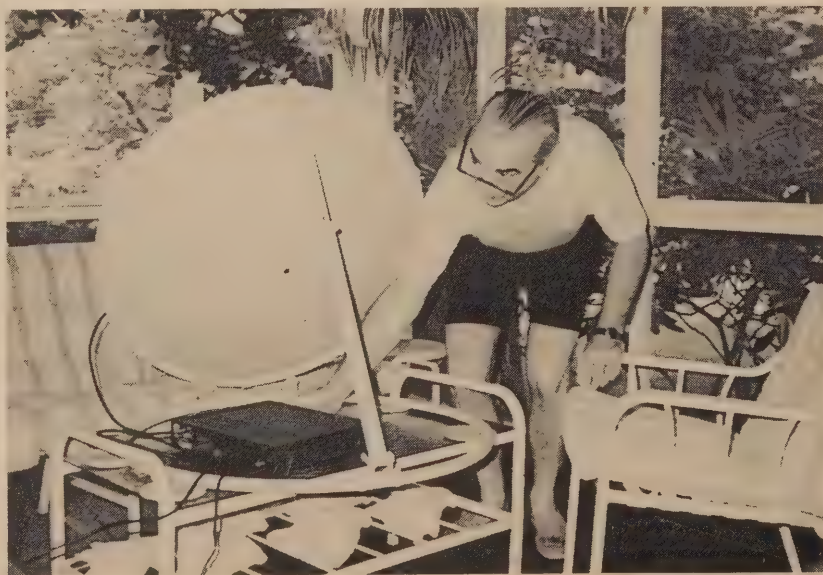
spending about the same or less than you spent for the Sony TV the system played on. Not bad.

With C band TVRO in something of a slump because of scrambling uncertainty, I believe we need to sharpen our skills and go to work finding new products and services which appeal to the consumers. Ku has been the promise of TVRO for nearly a decade now. It is now operational and there are 16 transponders on RCA's Ku-1 and Ku-2 birds; or 32 total. Granted, not all of these transponders may be in use full-time for unscrambled television service but all have that capability. More important, they work—work very well with modest equipment. I think the promise of Ku has been fulfilled and it now is resting in a temporary position roughly akin to where C band technology and transponder availability rested in 1979. I concede that we do need more 50 watt per transponder birds up there and more programmers bright enough to take advantage of this new technology. But I argue that we do not need more ground segment technology. There are no new inventions required, no new breakthroughs. Ku band is ready to become a powerful force in the home TV satellite world. And I challenge Coop to find otherwise.

**Picture Perfect** - NBC network feed from RCA Ku band bird. Dish and electronics package cost about as much as a good TV set!



**Works Inside** - Ku can be in home and aimed through window provided you're shooting through plastic or unleaded glass.



## Counterpoint

BY BOB COOPER, JR.

**OK,** I concede that Peter Sutro can produce high quality pictures on one of Frank Weeks' 32 inch miracle dishes. I also concede that if Peter can do this, virtually anyone else can do it as well. But I think Peter misses my original point. We are not short on technology; we are short on programming.

Peter's side yard in suburban New Jersey is a very representative test site. Within 200 miles of Peter's home, there are probably nearly 20 million homes that, given the correct marketing emphasis, would purchase a small dish system. But, what might that marketing emphasis be? Programming of course. So where is the programming???

I don't understand RCA. Here they are, in the sky, with the two most powerful satellites in captivity today. So what does RCA do with these great machines? They turn their use over to those TV broadcasters and other big dollar firms (such as AT&T) because those were the people with the dollars and insight to experiment with what





**No Tools Required** - DS 32 inch Ku band dish sits comfortably on lawn and can be assembled in less than 5 minutes.

has been billed as new technology. That effectively pre-empted the TV programmers from being a part of this new technology; at least during the first round of the Ku development.

Actually, *I do understand RCA*. They played it safe by taking their new technology to users who could in no way cause them embarrassment. RCA is beholden to cable for their C band revenues on F3R and F4; cable programmers make up the single largest revenue producers for RCA satellites. It follows that if you are RCA, you don't allow yourself to wave red flags in front of paying cable programmer customers. So RCA, not unexpectedly, didn't deliberately seek out any of the new DBS firms when they were trying to sell off their new Ku band transponders.

Peter's 32 inch dish is impressive and revealing. The pictures are as good as most people would demand for their money. But, the only really useful programming on RCA's Ku band birds is the multiple channel service from NBC, intended for their own affiliates. So what, if the complete terminal sells for a few hundred dollars; if all you get for your money is four separate feeds for the Tonight Show? The technology, clearly, is ahead of the usefulness of the service.

I think Ku band frightens the TV establishment badly. They know, down deep in the heart of their engineering labs, that Ku *could change* the way they do many things. Change, not formatted and controlled by the established TV networkers and broadcasters is frightening. RCA owned the transport ship of the future; a satellite so powerful

and so near perfect that people like Peter Sutro would one day discover that really small dishes propped up on \$10 mounts on the lawn would produce perfect pictures from space. RCA had to be careful how they allowed this new tool to be used; it was potentially the most important advance in communications since satellites themselves were conceived by Arthur C. Clarke.

So I say, 'So what Peter?' So it works and it makes nice pictures and it is clear. Now, Peter, tell me what are we going to do with this. Tell me how we turn your wonderful experiments into something that will help out today's starving dealers?

The promise of Ku band is even more disturbing because now that we have a system that works, the illusion of Ku band is more disturbing than ever. And the folks who own and control the present world of satellites are in no hurry to rush us into Ku band services.

I encourage people to try and experiment with the new equipment now available at such low prices for Ku band. I believe the equipment we are seeing is quite good and additional advances in Ku band hardware will be of marginal help to us as users. More people do need to see it work, and more people need to understand that if and when the programmers and the satellite operators get their acts together, we will be ready to distribute the hardware over the land.

Keep it up Peter; keep us honest and interested in the new technology as it does develop. Sooner or later we'll all put this technology to work for us again. ♣

## Black Boxes

*Continued from page 9*

could lead to orderly improvement by the adoption of new designs throughout the communications industry. This level of cooperation is not likely to be seen while a virtual monopoly exists.

At the present time we have a situation in which it is possible to build a unit that will decode all services, but it is not yet proper to sell such a unit because of the protections granted by law and by contract to signal suppliers and equipment manufacturers. But these matters are capable of being negotiated and compromised and agreed to in a way that will allow the public a broader choice of services from a narrow base of equipment.

If you have means of obtaining authorization for reception, you must do so. This is normally accomplished by subscribing to the signal before decoding it. You may never be caught if you don't do so but you will know that you are violating the law and the rights of others. Many would be happy to pay if a system for payment of reasonable fees for reasonable selections were available. A bill has been introduced in the House which would allow carriers to collect from Dish owners and pay copyright royalties in their behalf. This could be a solution to the copyright problem and the unauthorized reception problem. The average consumer is willing to pay a reasonable price for his entertainment but he wants it kept simple and easy to acquire and use.

How can you be harmed by the use of a black box? Well, if you are not caught, it is a rhetorical question. If you do not wish to misappropriate some one else's signal, you will not be interested in a black box solution. If you wish to try the box and are caught with it, there are still a lot of questions left unanswered. I have not yet learned of prosecutions for the use of black boxes.

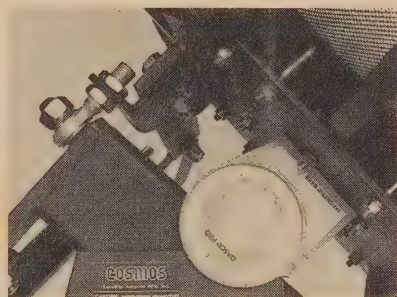
In the best of worlds the programs will be made available to a number of suppliers and accessible by a number of manufacturer's decoders, all of which are compatible and can decode any programming you should subscribe to and you will make your payment each month to one company, for all of the service you wish to obtain. We don't live in that world. Not yet, maybe not ever, but we may approach that level of efficiency in the future. Legally. ♣





## Polar Mount Alignment

### The Basics For Finding The Ku Band Satellites



Using Enclinator to determine declination angle.

**T**o track or not to track? That is the question when it comes locating the Ku-Band satellites. Here are the basics for making your dish pinpoint each of these new birds.

One of the fundamentals of satellite system installation has always been the correct alignment of the polar mount to accurately aim the dish at each satellite. With the addition of more Ku-Band satellites to the Clarke Belt, proper tracking of the polar mount is now even more critical. This is because the beamwidth of the 12 GHz signal is approximately 1/3 that of the 4 GHz signal. The beamwidth is the angle of view that the dish has to the satellite. This means that if your dish has a 1.5 degree beamwidth at 4 GHz, it will see only a 0.5 degree slice of the sky at 12 GHz. If the mount or feedhorn are slightly out of alignment, there's a good chance that the dish will not track the 12 GHz satellites even though it is working fine at 4GHz. Fortunately, most dish manufacturers are careful to design the proper adjustments into their polar mounts to make it possible to precisely track this arc as long as the correct angles are set.

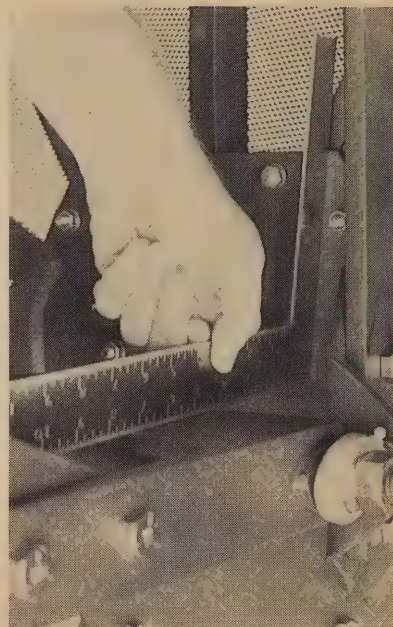
#### POLAR MOUNT THEORY

There are five basic angles to polar mount alignment. For the dish to track both the 4 GHz and 12 GHz birds, each of these angles must be set as accurately as possible. If any of these angles is not correct, some compensation in one or more of the other angles will be necessary. To simplify matters, it helps a lot to get each of these angles as close to perfect as possible.

**Vertical Mount Pole**—The steel pole that the mount sits on must be straight up and down.

**True South Azimuth**—The polar axis must be aligned with true south.

**Declination Angle**—The declination or offset angle is the "look down angle" between the mount axis and the antenna plane which allows viewing of satellites in the same plane as the



Carpenter's square checks declination.

equator. At the equator the declination angle is zero. The further north your location, the greater the declination angle.

**Mount Axis Angle**—This angle is comprised of the latitude angle of your location plus the polar axis tilt. The polar axis tilt is a reference to the fact that the mount axis is tilted slightly forward of the Earth's true polar axis. It is this angle which is often overlooked when aligning a polar mount.

In a recently published technical bulletin from Chaparral Communications, mechanical engineer, Bob Bruns, describes the most accurate method for aligning a polar mount. Using this method and the figures provided in the bulletin can theoretically result in a tracking accuracy better than +/- .01 degrees over the entire arc. One key to achieving this high a degree of tracking accuracy is the Polar Axis Tilt.

The mount axis of your dish is tilted forward slightly from the Earth's polar axis. The closer your location is to 45 degrees latitude, the greater this tilt angle will be. Refer to Figure 1. It is important to note that the polar axis tilt angles are listed in the accompanying chart only for reference. It is extremely difficult in practice to measure such small angular differences accurately. In actual practice, it is best to

Latitude, degrees	Polar, axis tilt, degrees	Declination, offset angle, degrees	Tangent, beta	Latitude, degrees	Polar, axis tilt, degrees	Declination, offset angle, degrees	Tangent, beta
1	0.02	0.15	0.0027	41	0.69	5.68	0.0994
2	0.05	0.30	0.0053	42	0.69	5.79	0.1013
3	0.07	0.46	0.0080	43	0.69	5.90	0.1033
4	0.10	0.61	0.0106	44	0.69	6.00	0.1052
5	0.12	0.76	0.0133	45	0.69	6.11	0.1070
6	0.15	0.91	0.0159	46	0.69	6.21	0.1089
7	0.17	1.06	0.0186	47	0.68	6.31	0.1107
8	0.20	1.21	0.0212	48	0.68	6.41	0.1124
9	0.22	1.36	0.0238	49	0.68	6.51	0.1141
10	0.24	1.51	0.0264	50	0.67	6.61	0.1158
11	0.27	1.66	0.0291	51	0.67	6.70	0.1175
12	0.29	1.81	0.0317	52	0.66	6.79	0.1191
13	0.31	1.96	0.0342	53	0.65	6.88	0.1207
14	0.33	2.11	0.0368	54	0.65	6.97	0.1222
15	0.36	2.26	0.0394	55	0.64	7.05	0.1237
16	0.38	2.40	0.0419	56	0.63	7.14	0.1252
17	0.40	2.55	0.0445	57	0.62	7.22	0.1266
18	0.42	2.69	0.0470	58	0.61	7.30	0.1280
19	0.44	2.84	0.0495	59	0.59	7.37	0.1294
20	0.46	2.98	0.0520	60	0.58	7.45	0.1307
21	0.47	3.13	0.0545	61	0.57	7.52	0.1320
22	0.49	3.26	0.0570	62	0.56	7.59	0.1332
23	0.51	3.40	0.0594	63	0.54	7.66	0.1344
24	0.52	3.54	0.0618	64	0.53	7.73	0.1356
25	0.54	3.68	0.0642	65	0.51	7.78	0.1367
26	0.56	3.81	0.0666	66	0.49	7.84	0.1378
27	0.57	3.95	0.0690	67	0.48	7.90	0.1388
28	0.58	4.08	0.0713	68	0.46	7.96	0.1398
29	0.60	4.21	0.0736	69	0.44	8.01	0.1407
30	0.61	4.34	0.0759	70	0.43	8.06	0.1416
31	0.62	4.47	0.0782	71	0.41	8.11	0.1425
32	0.63	4.60	0.0804	72	0.39	8.16	0.1433
33	0.64	4.72	0.0826	73	0.37	8.20	0.1441
34	0.65	4.85	0.0848	74	0.35	8.24	0.1448
35	0.66	4.97	0.0870	75	0.33	8.28	0.1455
36	0.66	5.09	0.0891	76	0.31	8.32	0.1462
37	0.67	5.21	0.0912	77	0.29	8.35	0.1468
38	0.67	5.33	0.0933	78	0.27	8.38	0.1473
39	0.68	5.45	0.0954	79	0.24	8.41	0.1479
40	0.68	5.56	0.0974	80	0.22	8.44	0.1483



set the mount pole, true south azimuth, declination, and mount axis angles as accurately as possible, then peak the dish elevation on the satellites. In this way the polar axis tilt is set automatically.

But before we apply this theory, let's take a few minutes to discuss some very important realities. First is the matter of the ability of your polar mount to remain stable, even in a moderately high wind. All mount hardware must be securely tightened to allow the mount to rotate without binding or allowing the dish to sag or rock. If your dish sways or shakes in even a moderate wind, this exercise not be for you. All of the tracking accuracy in the world won't be of much help if the actuator or mount hardware has a great deal of slop.

Other factors to consider are the parabolic shape of the dish and the alignment of the feedhorn. If the dish is warped or misshapen, or if the feedhorn is not located at the prime focus or perpendicular to the prime focus, it may be impossible to track the 12 GHz satellites.

Of course, most satellite dishes will perform just fine for Ku-Band reception if they are tracking properly. These are just a few things to keep in mind if you are shopping for a new system or are looking to upgrade your present system to receive all of the satellites.

## GETTING STARTED

The first angle to set or check is the vertical alignment of the mount pole. This is done with a long carpenter's

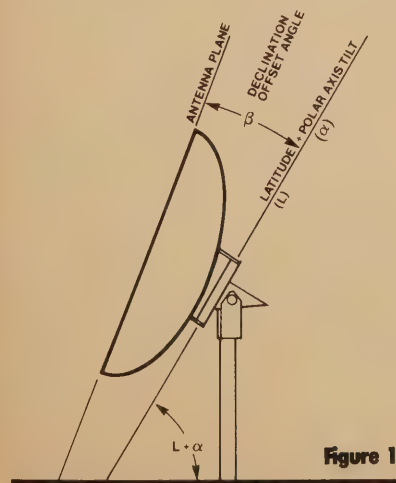


Figure 1

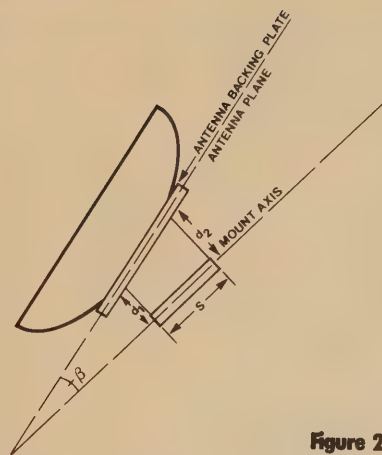


Figure 2

level or plumb bob. It should be straight up and down on all sides.

Next, the true south azimuth is set. This can be done by using a magnetic compass as long as the compass is kept at least 10 feet away from the steel mount and other steel structures. You must compensate for the magnetic variation for your location when finding true south with a magnetic compass. The magnetic variation is the difference between the bearing to the magnetic pole and the bearing to the true pole. This measurement can be supplied to you by a local airport.

## APPLYING THE THEORY

The declination and mount axis angles are dependent upon the latitude of your location. This information is available on any large scale map. When you know your latitude, refer to the chart below to determine your mount axis and declination angles.

### Declination Angle

The declination angle is set next. Many mounts do not provide scales, marks or procedures for setting the declination angle. Figure 2 illustrates the use of a handy formula.

First determine the declination angle for your latitude from the chart. If you do not know your latitude, this information is available from any large scale map. The distance from the mount axis to the antenna backing plate is measured at both the top and bottom of the axis; these measurements are shown as  $d_2$  and  $d_1$  respectively. The axis length  $S$  is measured between these two points. Refer to fi-

gure 2. The declination angle,  $B$ , can then be calculated by the formula:

$$\beta = \arctan \frac{d_2 - d_1}{S}$$

We can rewrite the equation if we know  $S$ , and the recommended value for  $B$ , the declination angle from the chart.

$$d_2 - d_1 = S(\tan \beta)$$

For example, at 35 degrees N latitude, the optimum declination angle is 4.97. If we measure the distance from the antenna plane (or backing plate) to the mount axis at two points apart on that axis, we find that the difference between  $d_2$  and  $d_1$  should be:

$$d_2 - d_1 = (12 \text{ inches}) \times (\tan 4.97)$$

$$d_2 - d_1 = 12 (.0870)$$

$$d_2 - d_1 = 1.04 \text{ inches}$$

$$d_2 - d_1 = 1\text{-}3/64 \text{ inches}$$

Therefore, the difference between the  $d_2$  and  $d_1$  measurements should be set at 1-3/64 inches. This setting should be made to the greatest degree of accuracy possible, as any error will result in a proportional tracking error. Photo B shows a good method for measuring  $d_1$  and  $d_2$ . You can also check this angle with an inclinometer (Photo A).

### Mount Axis Angle

After setting the declination angle, the mount axis angle is set. The mount axis is the latitude plus the polar axis tilt. You can determine your latitude from any large scale map. Your location is probably not exactly on a latitude, so you may need to add a fraction of a degree to the latitude shown on the map. Next, refer to the chart to determine your mount axis. The following formula will help:

$$\text{latitude (L)} + \text{polar axis tilt (a)} = \text{mount axis angle}$$

The mount axis angle can be checked with an inclinometer

After setting each of these angles as accurately as possible, track the dish to locate the satellites. Minor adjustments to the North/South axis and the mount axis may be necessary to peak the dish on each satellite. The investment of a few extra minutes to accurately set the angles in your mount will pay off with an easier installation and improved system performance.

Photos and illustrations courtesy of Chaparral Communications Inc.



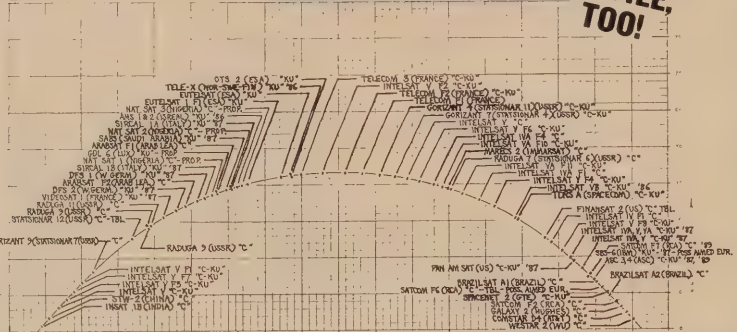
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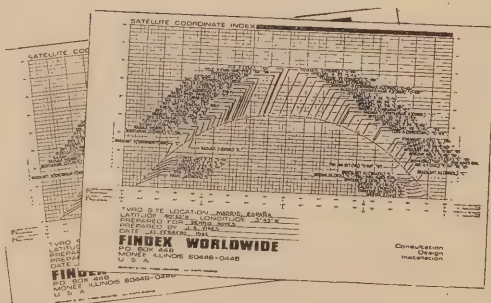
SATELLITE COORDINATE INDEX



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PREPARED FOR DENNIS VINES  
PREPARED BY J.K. VINES  
DATE 27 FEBRUARY, 1986  
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## Won't Scramble

Continued from page 33

as well as a second service on Canadian satellite. "Hit Video USA" is found on Satcom F4, TR18 with 24 hour non-stop (rock) music videos. MTV would tell you, as a counterpoint to the Hit Video service, that many of the newer, top and current videos are "exclusive" to MTV and will not show up on services such as "Hit Video". The other side of the coin is that some people have filed objections to the "blood and gore" contents on many of the MTV televised videos and Hit Music makes that point that their videos are less likely to "offend" delicate tastes. Regardless, if you like music videos, Hit Video USA has it without the MTV look and they do not intend to scramble. Additionally, there is a Canadian version of MTV on Anik D, TR6 and while ultimately this Canadian service (MuchMusic) might scramble, for now if you are hooked on the MTV contents, you'll find it available on Anik D.

### SUMMARY

As you can tell from this general overview of the non-scrambled and not-to-scramble services now available on satellite, *the skies have not gone dark*. With the advent of new services such as "The Movie Network" and "The Caribbean Satellite (Network) Service", we are seeing the first wave of an entire new generation of programmers who feel they can survive without cable and without scrambling.

Scrambling has changed the way the skies look but it has hardly closed the skies down. Quite the contrary, with the advent of scrambling the users of TVRO are finding there is a much richer diversity of programming available via satellite than the local cable service or over-the-air broadcast service provides. Owning a home dish is still the most exciting and wide-open access to diversified programming available in the world today. As we all adjust to cable's scrambling plans, we will see a considerable increase in these specialized programming services which are just now poking a cautious toe into the satellite programming pool.

Today is still the best day of your life to invest in a home dish system. Each day you wait is one more day's programming you will never participate in during your lifetime. Come on in; the satellite programming water has never been more inviting!





**Proud Owner** - Harrah from West Virginia.

## Fun and Games from page 25

is blacked out, the place is filled to capacity with many people being turned away.

"We at least double our business on days like that," Morris said.

The evening Morris was interviewed, he said he was leaving on a two-week vacation to Hawaii the next day with a relatively new wife, Judy.

Legends and its success has made such vacations possible. He's come a long way since selling garments out of his car in the late '70s.

Morris traveled to the United States from England with his grandmother in 1966 and finished high school in Pennsylvania. He came to Long Beach in 1972. For a while the following year, he attended Long Beach City College. He wasn't quite sure what he wanted to do with his life.

A sports bar equipped with satellite dishes has provided a clearer picture.

Meanwhile, Harrah always knew what he wanted to do. Naturally strong, he wanted to play professional football. He grew to be 6 foot, 5 inches, 265-pounds and, through weight training, became so strong that he earned the nickname Herc, short for Hercules.

Harrah, also recently married, is a well-paid pro athlete, so he doesn't rely on Legends for his livelihood. But since he is well known, Legends' reputation is important to him, because it reflects on him.

One thing for sure, Harrah's reputation on the football field is a good one. At 33, he is the oldest Ram. He is a team captain. He was a first-round draft pick in 1975 and has since played in three Pro Bowls.

Harrah, a star at Stonewall High School in Charleston, W.Va., went to the University of Miami (Fla.), where he was an All-American.

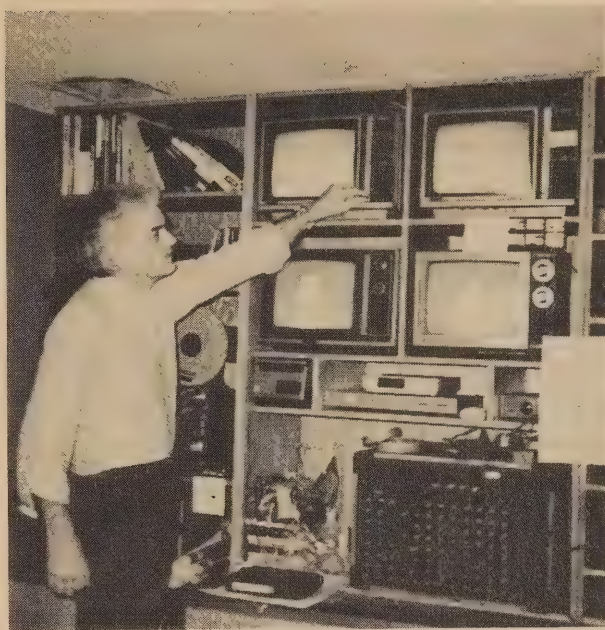
Now in the twilight of his career, he knows what he wants to do in retirement. He wants to stay in the restaurant business. It's been very good to him—thanks in great deal to satellite dishes.

Other bar-restaurants in Long Beach have since installed dishes, and also enjoyed success. Tony Macone, owner of the Village Inn, says he does 10 to 15 times his normal bar business on a day he can offer a major sporting event that people without dishes cannot get.

"Two football Sundays where the Rams or Raiders were blacked out, and I had my money back," said Macone, who paid \$2,800 for his unit.

Bob Comminos of The Captain's Quarters spent \$3,800 for a satellite dish two years ago. "A great investment," said Comminos.

Leon Bartolino, a bartender at the The Captain's Quarters, was so impressed that he and his roommate Bruce Hershey now have a satellite dish in their home. ❖



**Picking The Sport To View** - Co-owner Morris in his office.



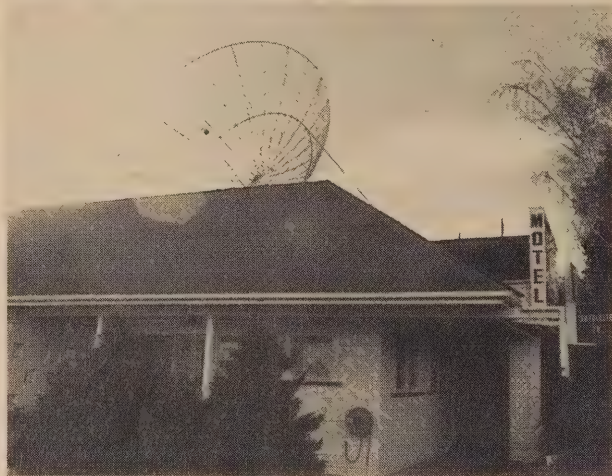
**Four Screens** - Located in each corner of Legends.



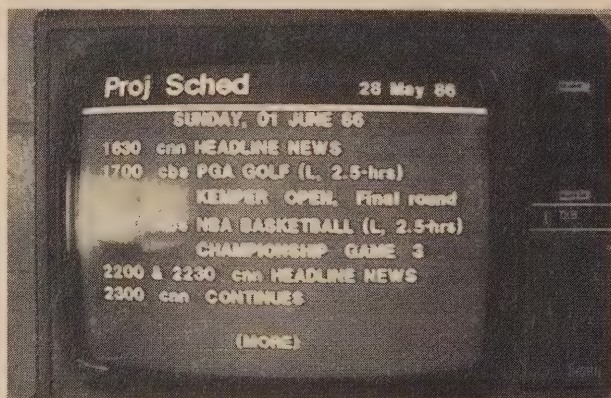
**Lively Crowd** - Out for dinner, drinks and a sporting time.



# How Small It Is Continued from page 11



**New Zealand Dish** - 25 foot mesh with KLM electronics.



**American Programming** - AFRTS schedule off motel room screen. American NTSC video is converted to PAL with transcoder at motel satellite "headend."

in charge of the operation. He sees scrambling of the AFRTS feed as a matter of some (US) national urgency. "This service is designed and intended for the U.S. Defense Department personnel outside of the United States. Our agreement with our program sources is that the programming is limited to Defense Department personnel only."

AFRTS is programming 24 hours per day with a selection of programs from all three US networks, CNN and ESPN. The armed forces have written agreements with these commercial networks and those agreements allow AFRTS retransmission of the programs to American personnel worldwide. The Defense Department pays very little for those program rights. Now, says Pollack, his program sources are demanding that AFRTS scramble their service. He has been told "We are less able to sell our programming (overseas) when you are distributing it to virtually the entire world free of charge. Either pay us for your audience that is not a part of the Defense Department, or scramble your transmissions so there is no audience outside of the Defense Department personnel."

Rightfully, this alarms those people and firms in the South Pacific who have built business around the AFRTS transmission. This alarm extends far wider than the obvious builders and sellers of the satellite dishes and equipment; it includes a significant segment of the New Zealand motel industry as well.

Scrambling is a rapidly developing deterrent to the widespread enjoyment of television reception. The loss of the AFRTS channel in the Pacific is far more serious to that region of the world than the loss of 10 to 20 cable programming channels in North America because we have plenty more where those 20 came from. In the Pacific, there is no other satellite service available.

A nice, tidy case could be built decrying the heavy hand of Uncle Sam here. The government operates (the) Voice Of America as an instrument of American information. The USIA operates a two hour per day television service sent to Europe where it is carried by many cable television systems. These services cost the US government millions of dollars annually to reach, impress, and persuade people. The AFRTS service includes radio and television networks. For decades the radio services have been transmitted worldwide, 24 hours per day, using shortwave transmitters. Anyone with a shortwave radio, anyplace in the world, can tune in these broadcasts.

There are more than 300 American bases receiving US television, via satellite and on tape, worldwide. Virtually everyone of these bases distributes television to the tenants on the base. Most of these bases distribute this television through the air, using low power television transmitters. The television signals, not unexpectedly, do not stop at the boundary between the American bases and the native countryside beyond. Around these 300 bases there are hundreds of thousands, perhaps millions of non US residents who are watching American television for the price of a US standards TV set and a \$10 aerial.

Yet Colonel Pollack says that he and AFRTS are under pressure to scramble the satellite television feeds—soon. The Colonel neglects to mention why the Defense Department is not scrambling its shortwave radio feeds or what the station managers at these 300 plus bases are doing to prevent natives from directly receiving the US bases programs.

More concerning than any of these technical mistakes is the human error about to be perpetrated upon our friends in the South Pacific. In the three most dish-populated countries in the South Pacific (Australia, PNG and New Zealand, in that order) there are fewer than 5,000 dishes involved. With the exception of New Zealand, where Patti and I were able to locate one (!) privately owned dish by a home owner, these dish terminals have gone into areas where there is no (local) national television. Unlike the United States where home dishes have made some inroads in cabled areas, or into areas where people already had local broadcast television available, these 4,999 dishes in the South Pacific have no service other than their AFRTS service. Colonel Pollack apparently believes the US networks when they tell him he must scramble to insure that the programs he carries on AFRTS are not viewed by locals in these countries before the same programs can be sold to the local broadcasting companies.

There are no local broadcasting companies.

There is also no other service available. None of the countries in the South Pacific have taken steps to curtail this viewing; none have created laws or regulations or even large licensing fees for dishes. A country opposed to foreign satellite television reception always does those things, at home, first. They either regulate, legislate or tax home dishes out of service (Jamaica, recently tried to enact a \$2,000 annual fee for home dishes!).

American television is a very appealing commodity worldwide. Our programs are, indeed, sold worldwide and they help out in the balance of payments game we play with countries we import from (such as New Zealand). American television, when it is good, is the best in the world today. AFRTS satellite feeds consist only of news, sports, and current events. You won't see the Bill Cosby show on satellite on AFRTS. This makes the AFRTS feeds, laced with American current events, a window of America for the world. To lose that window overseas would be a terrible mistake in American foreign policy.

The harm that will result from scrambling the AFRTS feeds worldwide is far greater than the networks apparently imagine is occurring with the continuation of unscrambled AFRTS feeds. American foreign policy needs all of the points it can find overseas. The best thing that could happen to our foreign policy is for the AFRTS service to be somehow made available universally, worldwide with sufficient transmitter power that \$100 antennas and \$100 receivers could pick it up. The announced policy of AFRTS is directly backwards from where the US government should be going with AFRTS. They have a winner here and America needs more winners overseas. To scramble this service would be a serious error. 🚀



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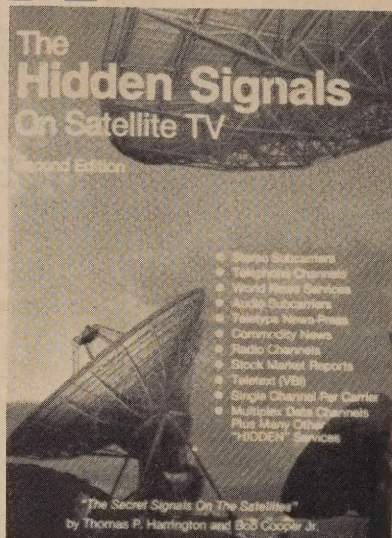
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When Hurricane Kate shrieked across the Caribbean last November, three of our stock Paraclipses in varying sizes were among a total of 22 dishes at Bob Cooper's West Indies Video (WIV) Test Site on Provo Island.

The WIV facility is also responsible for 15 additional "off site" antennas scattered through the Turk and Caicos Islands. And its reason for being there is to test performance...not storm survival.

But Kate could not have cared less.

It was as if Hurricane Kate took dead aim at the Provo Test Site, slamming directly into it... battering its antennas from front, side and back with the first 100 mph winds the area had seen since 1960.

Of the 37 antennas at the test site and nearby locations, only two survived the 4½ hours of Kate's hammering with no damage whatsoever. Both were Paraclipse antennas... one was the new nine foot (2.8m) Cog Drive model (CD), the same kind you might find in use at any home, anywhere; the other a 16 foot (4.8m) antenna, our senior, commercial service antenna.

Several Paraclipse antennas survived with only minor damages due to motor drive failures.

In the accompanying photographs, you will see antennas utilizing various designs and materials. All of the antennas were equally exposed. None of the photos have been retouched except to delete specific logos.

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